

UIC International Workshop Weed control on Railways : what future for herbicides ? (Paris May 24-25, 2016)

Chemical providers point of view

CropLife International :
Global federation of the plant science industry
Presented by: Chris Leake

Executive Summary

Background

- The last workshop on Vegetation and Tracksides Land, was held by UIC Oct 2013 (Coventry) at which CLI participated.
- It confirmation that Vegetation Management is a core issue for the railways industry.
- Synthetic herbicides are established as the cornerstone of Rail Vegetation Management strategies.
- Use of plant protection products needs a fresh look to address challenges from sustainable development and regulatory perspectives by the integration of new technologies and stewardship initiatives.

Objectives

- Summarizing and updating the key issues of crop protection technologies.
- Setting the frame for a real dialogue, and synergy between UIC and CropLife associations.
- Ultimate objective to propose a closer collaboration with the creation of a workshop / working group based on partnership - before it is too late.

Presentation Outline

Building new momentum for industry cooperation

- *Where are we coming from....*
- *What has happened since the 2013 meeting*
- *The context for our industry and rail vegetation management perspective? (tougher regulation, not a rosy outlook for the future of established technologies....)*
- *Making a fresh start.... (CLI views on next steps)*

About the Associations

CropLife & ECPA GAPEG



CropLife International: Global federation of the plant science industry

ECPA: European Crop Protection Association, a member of CropLife International

ECPA-GAPEG: ECPA Expert group focusing on non-agricultural uses



CropLife International is a global federation representing the plant science industry. On the industry's behalf, we address international developments in crop protection and agricultural biotechnology.

We promote approaches that enhance sustainable agriculture in the interests of farmers, consumers and the environment. CropLife International aims to provide transparent information to its stakeholders and welcomes open dialogue with parties interested in the future of food and farming.

We are committed to supporting the safe and responsible use of the industry's products in order to provide a secure, varied, healthy and affordable diet for consumers..

Our activities are financed by our [member associations](#) and our research and development-driven [member companies](#).



About GAPEG

The Garden and Amenities Expert Group (GAPEG) is a working group under ECPA promoting a sustainable use of PPPs in and around home & garden areas as well as public areas.

Companies involved in Railway Vegetation Management

CropLife International Members

- Monsanto Industrial & Amenity
- Dow AgroSciences
- Bayer
- DuPont
- BASF
- ADAMA Agricultural Solutions (Alligare)
- Arysta LifeScience
- Spiess Urania Chemicals
- Sumitomo-Valent
- ISK Biosciences
- Nufarm



About UIC Railways

UIC members involved



- Worldwide international organization of the railway sector
- Mission: to promote rail transport at world level and meet the challenges of mobility and sustainable development
- UIC Declaration for Sustainable Mobility and Transport: Reduce environmental impacts and improve service to customers and society
- ~200 members:



UIC & CropLife Alignment

Same goal: maintain availability of railway herbicides
(EU Sustainable Use Directive 128/2009/EC – restricts/reduces uses/risks on hard surfaces and requires national Action plans to reduce pesticide risk.)

- UIC (and CER) opposed to railway herbicide restrictions in 2009



14 October 2007

New pesticides legislation should not jeopardise rail safety

Tuesday, 13 January 2009

- The European railways support the fundamental objective of the EU to reduce the use of pesticides.
- The existing non-chemical methods of vegetation control are suitable only for supplementary use in smaller areas owing to their technical-operational parameters.
- Chemical vegetation control is therefore indispensable.
- Provided that the approved herbicides are used correctly, there is no risk of groundwater pollution in the railway area.
- The quantities of herbicides used could in future be precisely controlled by means of a computer-aided vegetation control management system.

A SUSTAINABLE USE OF PESTICIDES

CER-EIM-UIC Position on

Proposal for a directive establishing a framework for Community action to achieve a sustainable use of pesticides, and the EP Draft Report on the proposal for a directive

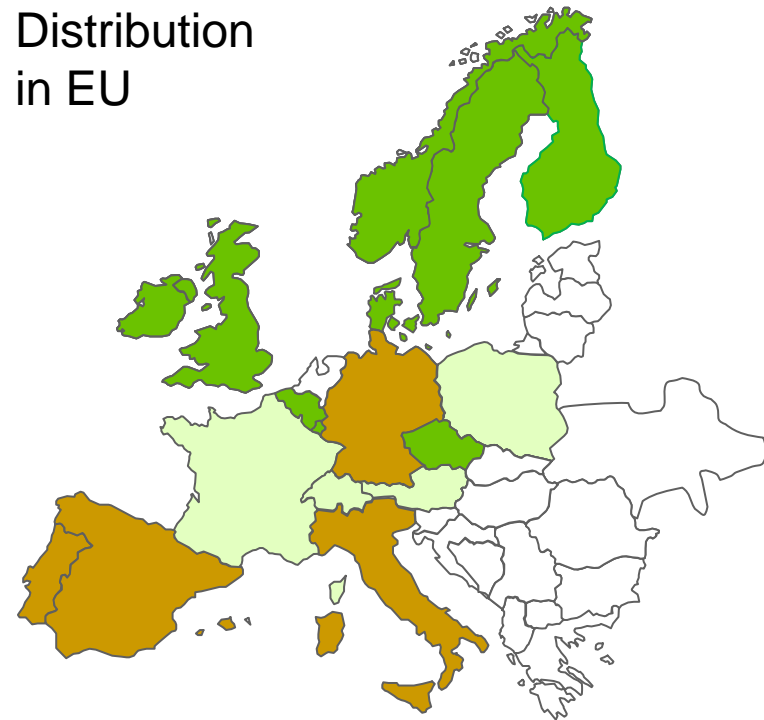
POSITION PAPER

Involvement of Contractors

Some railway industries are using contractors to manage vegetation

	Countries
Contractor Specified and Applied	Germany, Sweden, Spain, Australia, South Africa, USA, Canada
Customer Specified and Contractor Applied	UK, Belgium, Denmark, Luxemburg, CZ Republic
Customer Specified and Customer Applied	France, Austria, Poland, Turkey, Japan

Distribution
in EU



About Research and Development for new herbicides

Weed management R&D

Activities spanning from ideas to products in the market

Active Ingredient Discovery



Identification of novel highly active weed control products

- Discovery of new herbicides and safeners
- Identification and maintenance of a differentiating portfolio of chemical classes with new modes of action

Collaboration across R&D



Integrated approaches across units of R&D

- Discovery of new herbicide tolerant traits and explore transformation in crops
- Exploration of new weed control solutions

Development of new technologies



Continuously enhancing expertise in AgroScience technologies

- Exploration of new concepts and technologies
- Collaboration for target identification through systems biology approaches

Product support

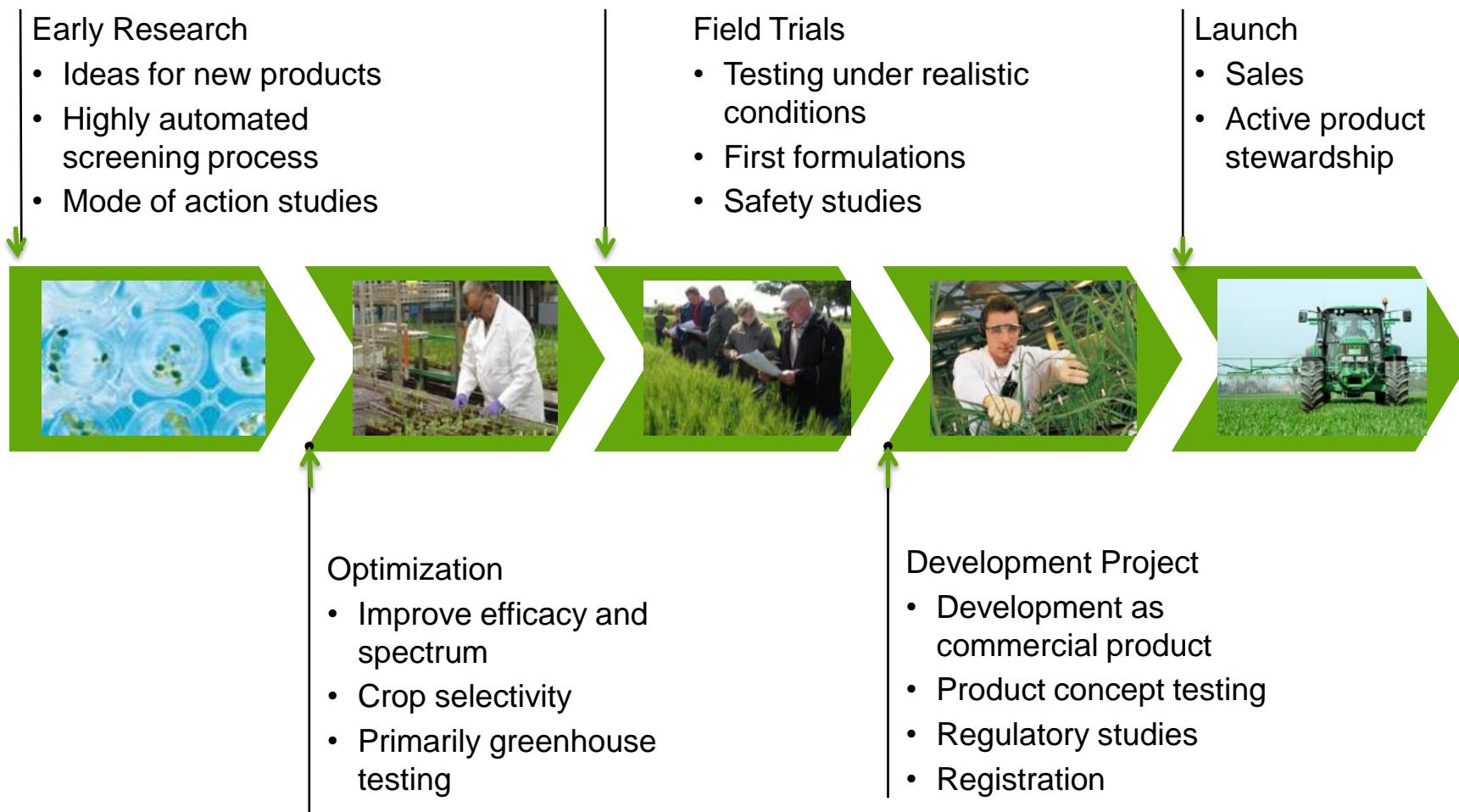


Safeguard sustainability of the product portfolio in the Ag market

- Weed Resistance Competence Center with global oversight
- Development of resistance management strategies
- Support for market products

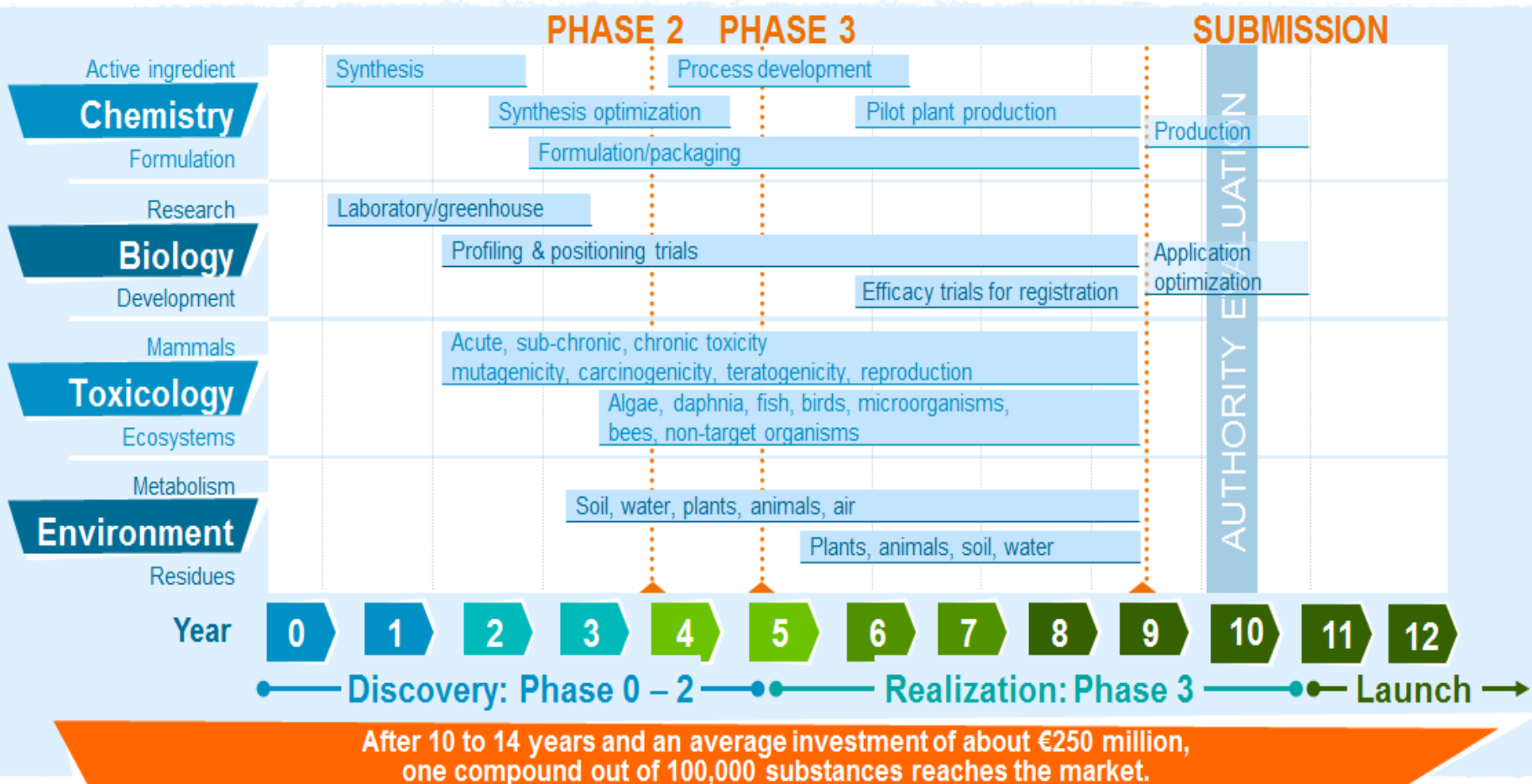
Finding new herbicides:

Key elements and steps of the R&D process



From Idea to Market

Developing a Crop Protection Product



About Vegetation Management for Railways

Vegetation management

Much more than weed control... involving preventative measures and railway trees health as well.









- Up-stream: eco-conception
- Preventive: plastic fabric under the ballast
- Forest: tree plantation to reduce stone fall, snow etc and to create green corridors (cf. Japanese Rail East experience)
- Tree issue: trees need to be monitored against **pest and diseases** to avoid tree fall on trains and railroads.
(cf. the “Tree Council” in the UK)
- Curative: - leaves on the rails
- - grazing sheep to reduce mowing
 - **weed control on ballast & shoulder**
 - brushwood on green edge



Why railway weed control?

Safety related aspects – part of mission and values

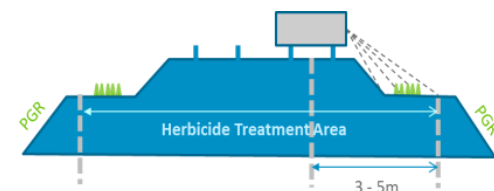
- Preservation of traction: plants causing lubricating film
- Sighting distance: plants hiding view of signals
- Safety for electric: avoiding incorporation of weeds in electric constructions
- Operating in the track area: area walkable for inspection
- Access to escape route: transition area as emergency exit
- Avoid vegetative fuel: prevent fire risk

	Issue	Risks	To reduce occurrence
	Trees/branches falling on to the track. Vegetation fouling the clearance envelope.	Injury to train drivers passengers on train. Injury to work crews. Damage to trains.	Select appropriate species that are not subject to windthrow or shedding branches. Plant trees a distance away from track of the mature height of the tree.
	Vegetation obstructing line of sight at level crossings.	Collision of trains with road vehicles who fail to give way.	Select appropriate low growing species, e.g. native grasses.
	Vegetation obstructing line of sight of signalling or signage.	Reduces braking distances of trains and increases chances of SPAD (signal passed at danger).	Maintain clearance envelope Select appropriate low growing species, e.g. native grasses.
	Vegetation fouling communication/power lines.	Broken telemetry wires may allow two trains to enter a section resulting in a head-on collision Fires may result from short circuiting power lines.	Maintain clearance envelope under and around pole lines.
	Vegetative fuel.	Sparks from trains or work crews, lightning strikes or arson may result in a fire on the rail reserve.	Reduce fuel loads by managing mechanically, burning or substituting with vegetation of lower biomass. Chemical management may be used in areas of non-native vegetation.
	Trees/shrubs on face of rock cutting leading to 'root jacking'.	Rocks falling onto rail infrastructure resulting in damage Rock falls causing injury to people.	Remove trees/shrubs from faces of rock cuttings.
	Excessive vegetative growth in work areas, e.g. signal boxes, shunting yards etc.	Hazardous to work crews – living dangers, e.g. snakes and also tripping hazards.	Keep work areas maintained – reduce weed growth as outlined in this document.
	Growth at the toe of ballast reduces track drainage.	Reducing drainage softens formation and leads to track defects and increased maintenance.	Keep toe area clear by use of appropriate chemical.

Why rail weed control?

Technical and operative aspects

- Quality of the track system:
stability of the track bed
- Good working of railway tracks including points
- Distance to electric constructions:
weeds influencing signal functionality
- Frost instability:
humus components collecting water as a sponge
- Need for residual herbicides for “white space” reasons



Economic aspects

- Extends life expectancy of the track system:
stability of the gravel
- Ballast cleaning: longer intervals, less maintenance
- Operating expense:
preventive weed control minimizing maintenance costs
- Alternatives to chemical control would be much more expensive – up to x10

Herbicide solutions

Sole reliable way to manage vegetation

- Spraying synthetic herbicide is the sole reliable way to manage vegetation, at the moment
- Alternative methods of control are not effective (mechanical, thermal, natural methods) and/or not economic solutions
- Preventative measures are being evaluated

Context of the railway use

- Railway use represents a fraction of the total synthetic active substances: < ca 0.5%
- Solutions often coming from crop protection (not adapted packaging) but closed system transfers possible (negligible exposure)
- Aging application technologies (vs. infra red detection system, GPS, nozzle spraying systems, water volume, formulations, etc)
- Solution depletion: losing registrations (SUD implementation, HardSpec hurdles, autumn treatment for brushkillers, etc)

Invasive & Noxious weeds

Growing concern for railways across Europe and the world

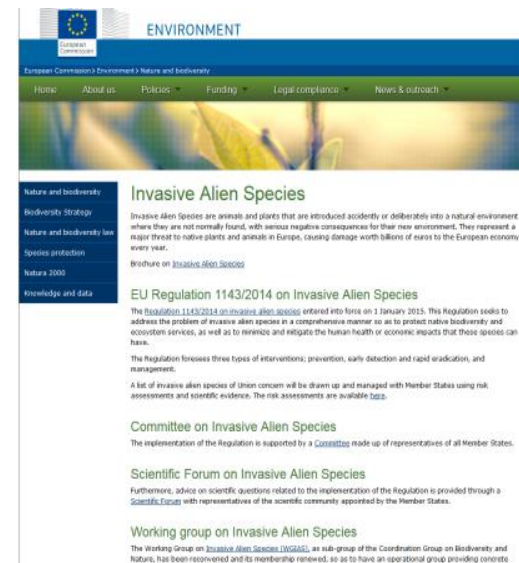
- Issue: Invasive weed problem Europe, with risk to infrastructure, signalization, worker health, allergy, and neighborhoods
- Species: Hogweed, Japanese knotweed, Common ragweed
- France: Sigma system to map out brushwood development
- Germany: Monitoring, mechanical cutting and DB leaflet on risks
- Translink: Identifying Non-Native Species (INNS) in Northern Ireland
- Austria: ÖBB Infra will create a GIS layer on INNS



Invasive Alien Species (IAS)

Regulation (EU) no 1143/2014 on the Prevention and Management of the Introduction and spread of Invasive Alien Species (IAS)

- The Regulation 1143/2014 on invasive alien species entered into force on 1 January 2015
- A list of 12,000 IAS, which are costing the EU 12 billion € p.a to manage in terms of damage and control costs, has been issued, including Japanese Knotweed, Ragwort, Giant Hogweed
- Member countries will issue a list of IAS to be reviewed from 1st January 2016
- Main message is that the approach needs to be preventative to stop spread of IAS species across borders
- By 1 June 2019, Member States shall provide with action plans, including control system on alien weed species

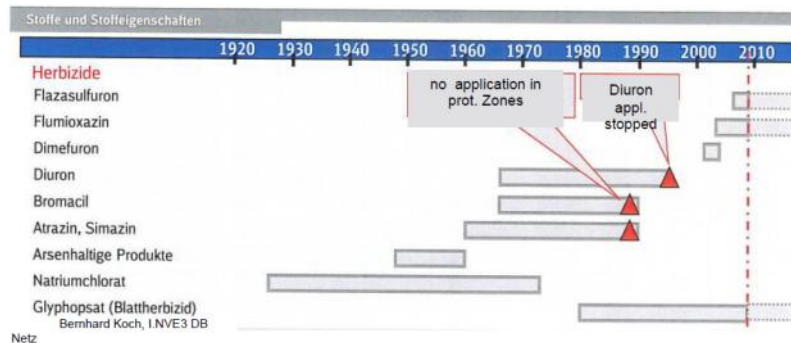


Herbicides in Soil & Water

Issue and cost from herbicide contamination on railroad properties

- Perception that the railway use leads to widespread contamination
- However in DB region south-west, pesticides represent 5% of the contamination cases in 2012 (biggest are Hydro carbons, BTXE, heavy metal)
- Clean up efforts can be painful and costly

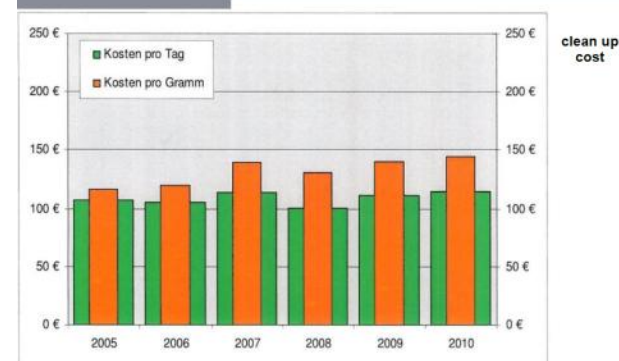
Timeline for use of herbicides



UIC Rail AG, DB Immobilien Sanierungsmanagement Rolf Gerhardt 01.02.10.2013 77



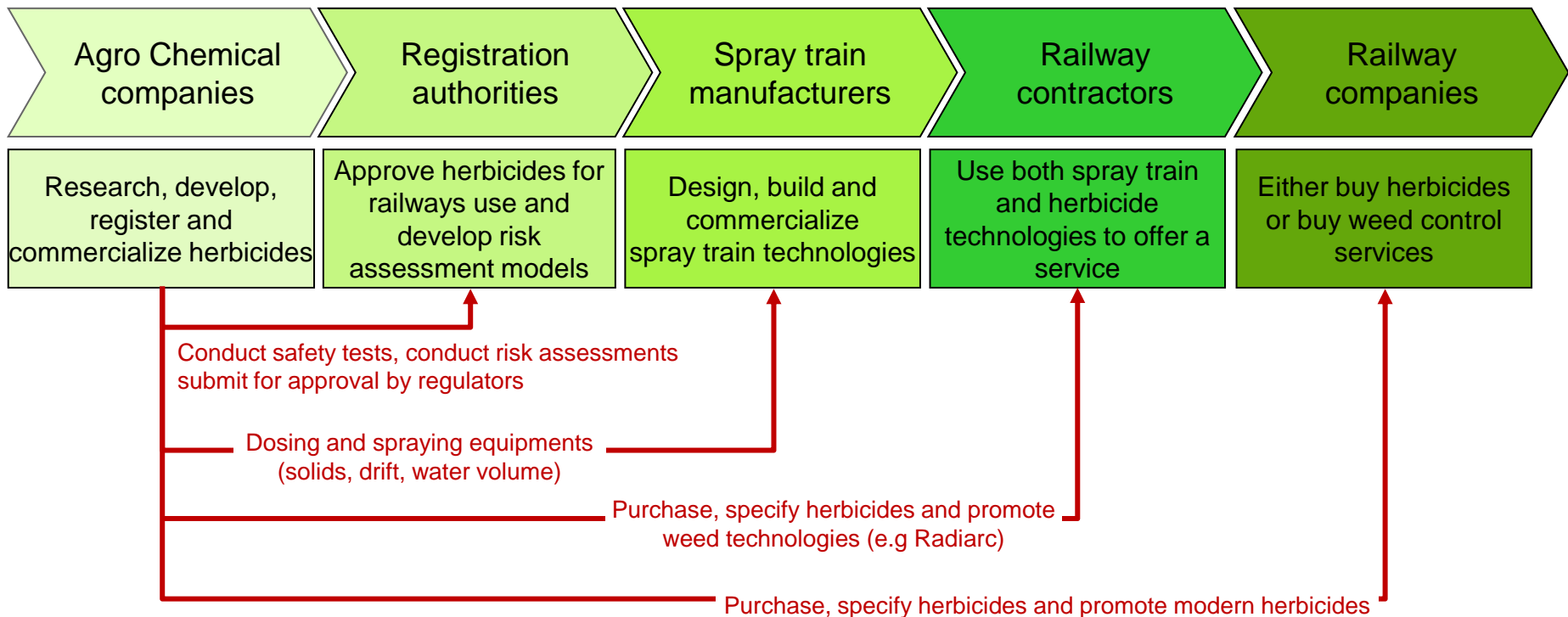
Herbicide in soil & groundwater



UIC Rail AG, DB Immobilien Sanierungsmanagement Rolf Gerhardt 01.02.10.2013 22

Key stakeholders for Chemical weed control on railways

The 5 stakeholders share the same goal balancing weed control needs and risks, with new technologies



Spraytrain Inspection

JKI-SPISE working group is issuing spraytrain guidelines in which CropLife and Railways industries should be involved

- Directive 2009/128/CE - Article 8 “Inspection of Pesticide equipment in use: by 14 December 2016, Member States shall ensure that application equipment has been inspected at least once”. It is then required to be inspected regularly
- The SPISE (Standardized Procedure for the Inspection of Sprayers in Europe) enquiry results has shown that there is a wide variety of railway spray applications and technologies among all MS
 1. It is necessary to consider also the inspection of electronic devices like weed detectors that could be more used in future
 2. It is suggested to go forward in the definition of “SPISE Recommendations” on how to inspect such devices while waiting for a standard.
 3. Test methods for rail weed killing trains are not yet covered by EN-ISO16122



Regulatory Environment

2009 SUD of Pesticide Implementation

- National Action Plans (NAPs) from 2014 with various outcomes:
e.g herbicide use restrictions in Belgium (Flanders), IT tools in Germany
- Regulators need tools to determine the safety of products

EU Pesticide Package consists of two directives
and two regulations



Components of the so-called EU Pesticide



- 24.11.2009: "Directive on a Community framework for the sustainable use of pesticides" [2009/128/EC]
- 24.11.2009: „Regulation on the placing of plant protection products" [1107/2009/EC] - repeals Directives 79/117/ECC and 91/414/ECC
- 25.11.2009: "Directive amending Directive 2006/42/EC with regard to machinery for pesticide application" [2009/127/EC].
- 10.12.2009: „Regulation concerning statistics on pesticides" [1185/2009/EC]

Deutsche Bahn AG | Environmental Centre | TUM (S) | October 1 and 2, 2013

5



Nationaler Aktionsplan zur nachhaltigen Anwendung von Pflanzenschutzmitteln



Integrierter Pflanzenschutz im DB-Konzern in Deutschland

Leitlinien für eine nachhaltige Vegetationspflege
im Rahmen der Instandhaltung von Anlagen und Flächen

Deutsche Bahn AG
DB Umweltzentrum
Caroline-Mollath-Str. 5-15
10115 Berlin

Regulatory Approval

Loss of active substances under EU review - *by list*



List	No. ASs	Approved	Not approved	Pending
1	90	50	40	0
2	148	34	114	0
3	388	118	270	0
4	326	114	212	0
Total	952	316	636	0
New	227	168	22	37
Total Incl. new	1,179	484	658	37

Status: April 2016

Loss of active substances under EU review - *by type*

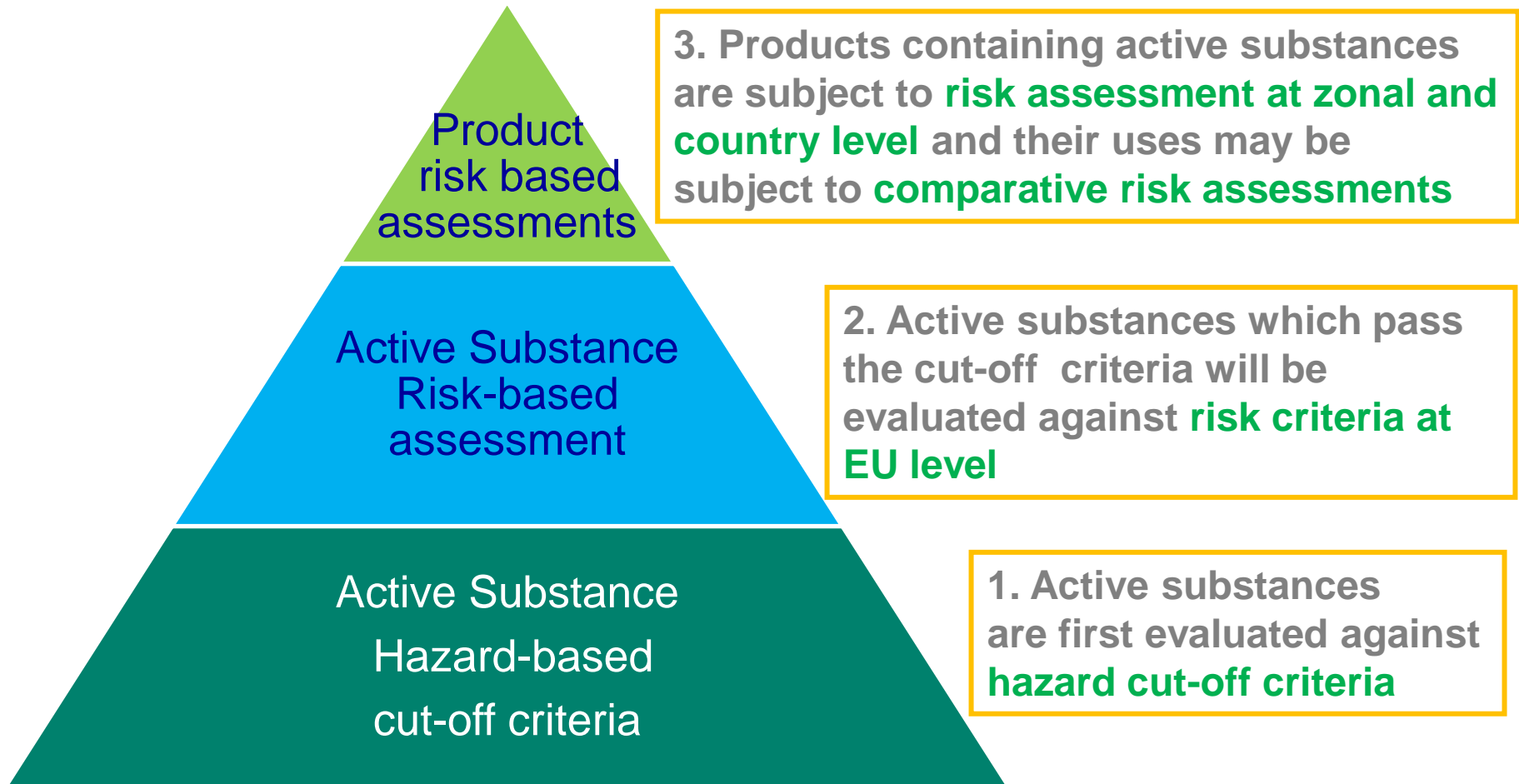


Type	No. ASs	Approved	Not approved	Pending
Herbicide	284	118	160	6
Fungicide	280	148	117	15
Insecticide	261	102	149	10
Other	354	116	232	6
Total	1,179	484	658	37

Status: April 2016

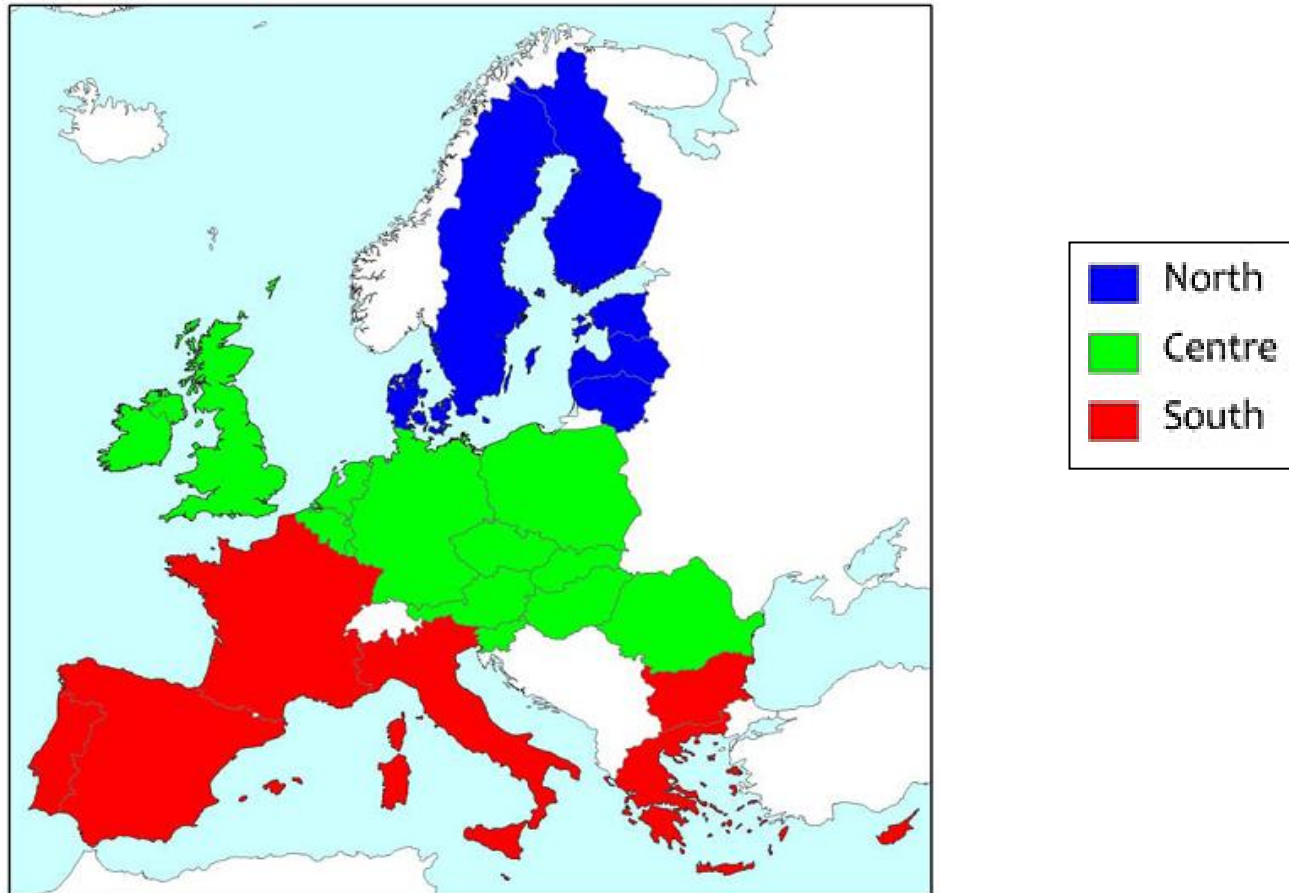
EU Approval

Three layers of process in EU to obtain a product approval



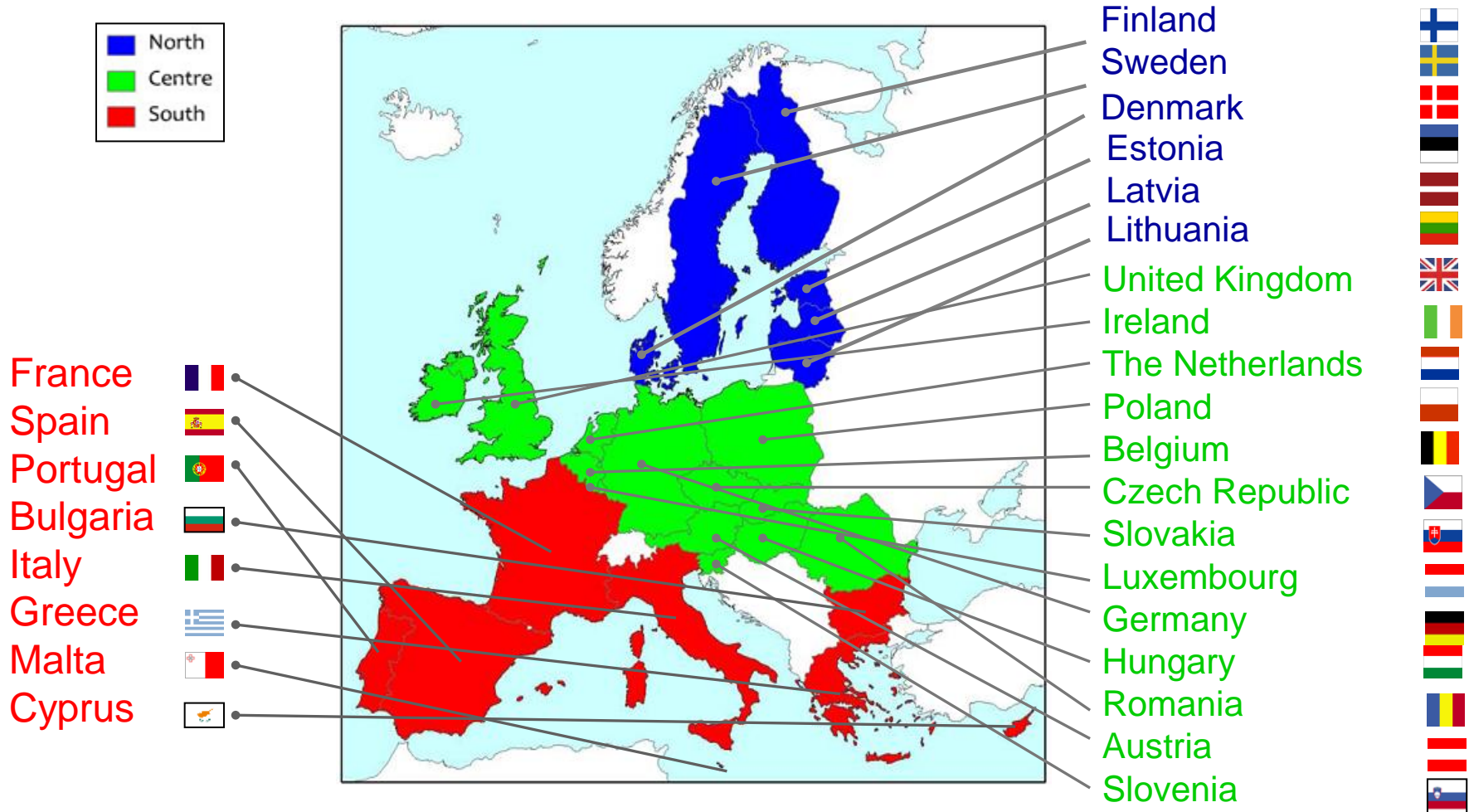
EU Approval

Three zones for the authorization of plant protection products



EU Approval

After zonal approval comes country approval – with country specific requirements- also for the world



Regulatory Tools

To provide tools for the regulators UK Pesticide registration authorities formed a steering group and developed a tool called HardSpec

HardSPEC

A First-tier Model for Estimating Surface- and Ground-Water Exposure resulting from Herbicides applied to Hard Surfaces

Model Overview and Technical Guidance for Users of version 1.4.2

by

J.M. Hollis¹, C.T. Ramwell^{2*}, I.P. Holman³ and M.J. Whelan⁴

With a section by staff of the Chemicals Regulation Directorate on regulatory use.

¹ Independent Consultant

² FERA, York

³ Department of Environmental Science and Technology, Cranfield University

⁴ Department of Geography, University of Leicester.

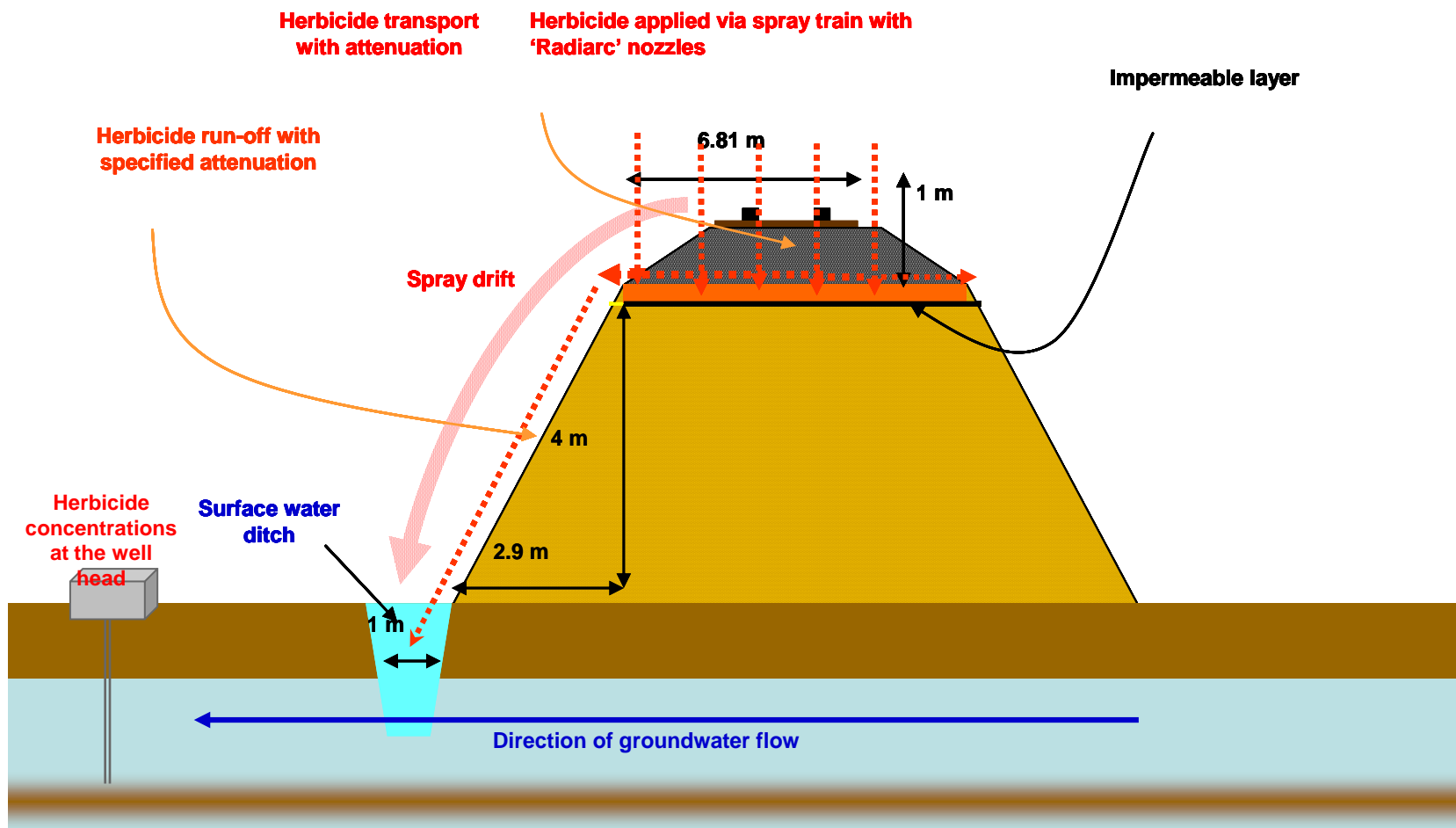
* To whom correspondence should be addressed

Regulatory Tools

HardSpec covered six scenarios – two relate to railways:

1. **Suburban (domestic use) Stream.** A surface water stream receiving surface drainage from a suburban catchment within which herbicides are applied to some hard surface areas on domestic properties.
2. **Urban Stream.** A surface water stream receiving surface drainage from an urban catchment within which the hard surface areas drain via gully pots.
3. **Urban Pond.** A pond receiving surface drainage waters from an urban catchment within which the hard surface areas drain via gully pots. This scenario is intended to represent the use of collecting ponds within Sustainable Urban Drainage Systems (SUDS).
4. **Major Road Stream.** A surface water stream receiving surface drainage from a major road in a rural setting where the hard surface areas drain via gully pots. The stream also receives drainage from an adjacent 1ha agricultural field.
5. **Railway Groundwater.** The abstraction point of a local groundwater body that receives herbicide leached from a double railway track which crosses the groundwater catchment.
6. **Railway Ditch.** A ditch adjacent to a railway embankment receiving water which has leached through railway ballast as well as spray drift from special “spray trains” running up and down the track.

HardSpec model



Taken from report by Hollis et. al.

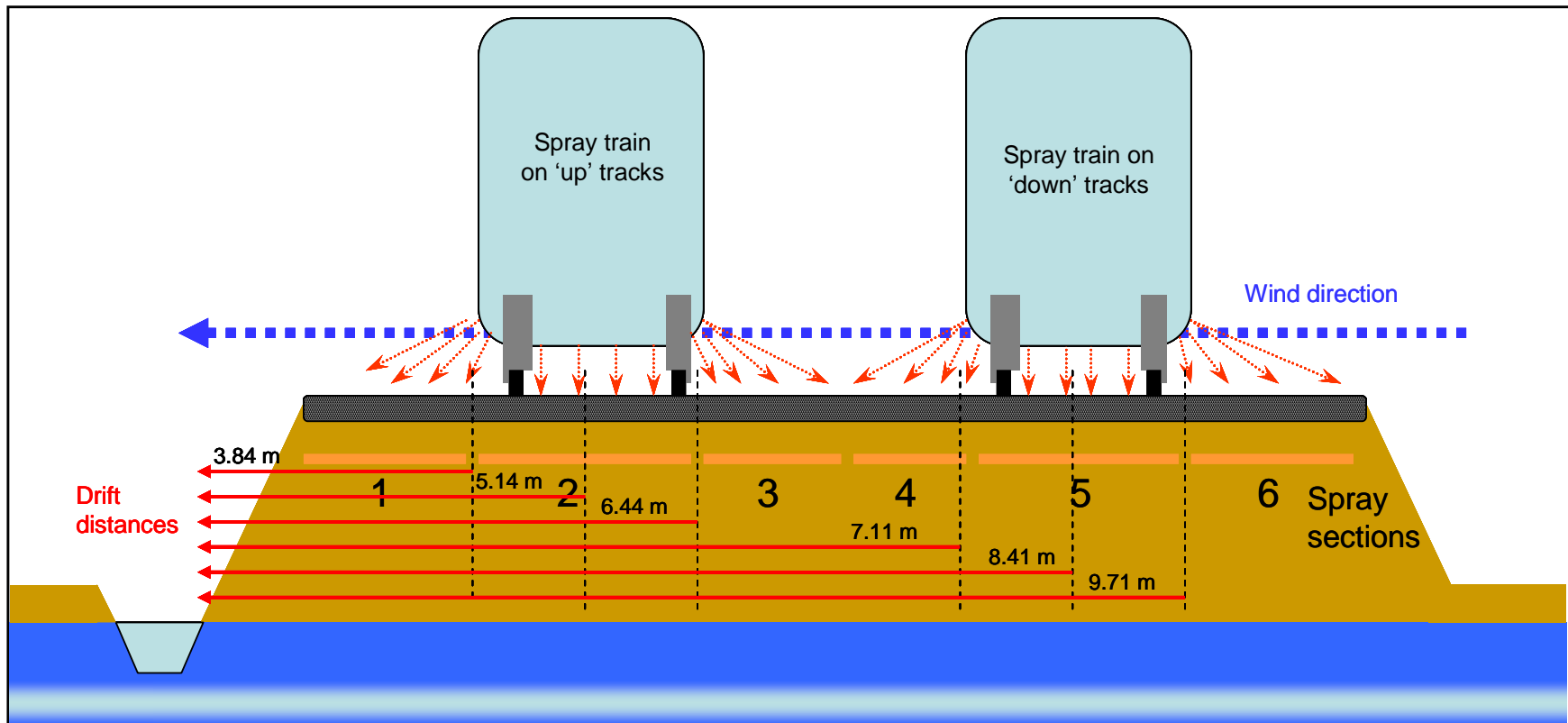
HOLLIS, J.M., RAMWELL, C.T., HOLMAN, I.P. and WHELAN M.J. (2011). HardSPEC: A First-tier Model for Estimating Surface- and Ground-Water Exposure resulting from Herbicides applied to Hard Surfaces: Model Overview and Technical Guidance for Users of version 1.4.2. Report to The Chemicals Regulation Directorate of the HSE. July 2014, 21 pp.

HardSpec model

The HardSpec model is based on UK conditions

- The model is designed to be very conservative, it is a first tier (but there is not yet a second tier developed)
- For the groundwater catchment near the railway it represents a 99.8th percentile worst-case for aquifer vulnerability
- In the railway surface water catchment there is a ditch directly adjacent to the embankment on which the railway runs. The embankment is unrealistically steep
- The impact of spray drift to a closely adjacent surface water ditch is unrealistic as, in reality, spray application is turned off in such vulnerable situations.
- However, it is the only known model available to regulators in Europe so besides the UK other countries e.g. France and Belgium use it semi-officially
- There is a miss-match between actual practice, available technology and the regulatory model – getting acceptance of refinements is difficult.

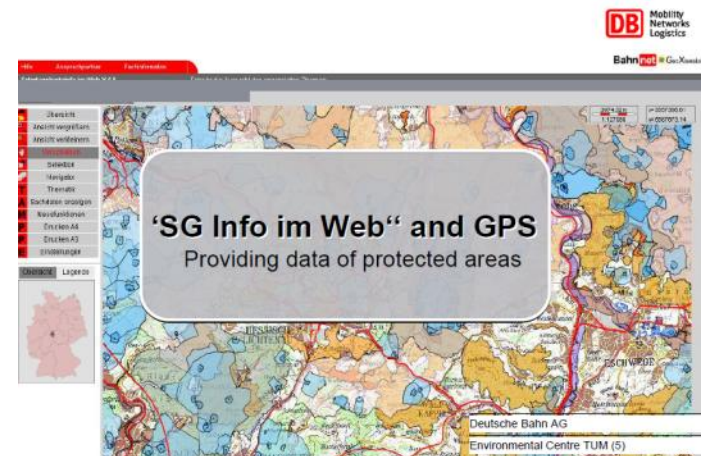
Calculation of downwind spray drift



Taken from report on HardSpec model by Hollis et al.

HOLLIS, J.M., RAMWELL, C.T., HOLMAN, I.P. and WHELAN M.J. (2011). HardSpec: A First-tier Model for Estimating Surface- and Ground-Water Exposure resulting from Herbicides applied to Hard Surfaces: Model Overview and Technical Guidance for Users of version 1.4.2. Report to The Chemicals Regulation Directorate of the HSE. July 2014, 21 pp.

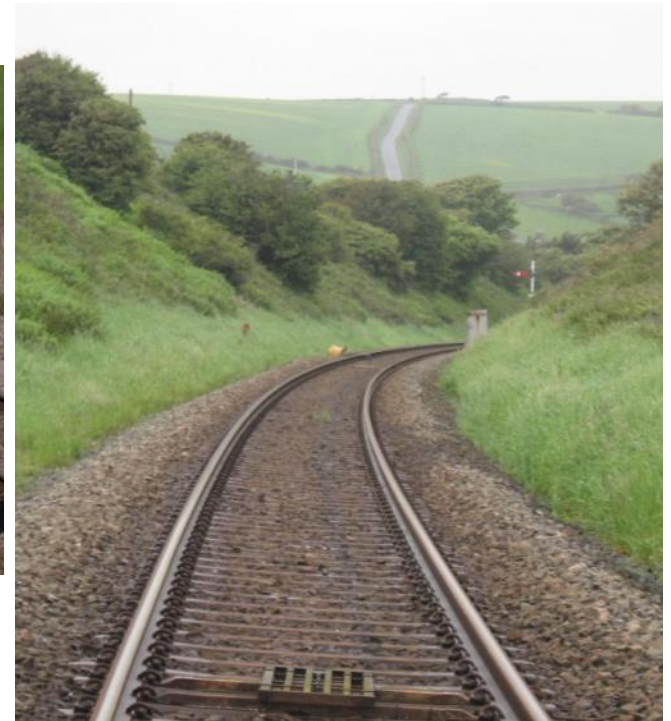
- SNCF: SIGMA real time, advanced automatic system to water bodies, overdosing prevention, protected areas, etc all trains (26) and trucks (28) equipped in 2014
- DB: current contractors in Germany, Bayer, Spiess and Lauff, need to have a GPS-GIS system by 2016
- Others: ÖBB (Austria) under development
InfraBel (Belgium) “Natura 2000” sites



Way forward CropLife and UIC



Pictures from JSD Rail, UK



Continued commitment of the plant science industry to railway vegetation management

Takeaways

Whereas...

- vegetation management remains a core issue for railway industry;
 - herbicides are key tools to manage vegetation on railways;
 - railway industries are concerned about the challenges of tougher weeds versus simultaneous need to reduce environmental impacts and wastes;
 - new regulatory hurdles call for optimized solutions by combining modern technologies with established technologies
 - need for effective stewardship trainings for 3rd party spray service providers;
-
- CropLife International and ECPA GAPEG members are committed to develop effective and safe herbicide solutions and to promote best practices
 - **But broad stakeholder engagement and joint actions are needed to defend the future of chemicals as integral part of railroad vegetation management**

Next Steps

Dialogue meeting with CropLife and UIC industries

- Lets work on what we can agree about first and move to actions
- Suggestion to be focused on three (previously agreed) working areas by addressing the following questions
 1. What new weed control technologies and innovation are out there to support an optimized use of crop protection tool?
 2. How best to address environmental issues and integrate into regulatory systems (EU as a starting point)?
 3. How to leverage sustainable development expertise: Assess needs and benefits, stewardship initiatives and waste management?
- Proposal to kick this off by an expert workshop hosted by UIC and CLI jointly by 1Q. 2017 (joint with ECPA-GAPEC team)

Thank you



Global Representative for Plant Science



AFRICA/MIDDLE EAST

AFRICABIO

CROPLIFE AFRICA/
MIDDLE EAST

ASIA PACIFIC

CBI JAPAN

JAPAN CROP PROTECTION
ASSOCIATION

CROPLIFE ASIA

NORTH AMERICA

CROPLIFE CANADA

CROPLIFE AMERICA

BIOTECHNOLOGY INDUSTRY
ORGANIZATION (BIO)

AGROBIO MEXICO

EUROPE

EUROPABIO

EUROPEAN CROP
PROTECTION ASSOCIATION

LATIN AMERICA

CROPLIFE LATIN AMERICA

AGROBIO BRAZIL

CIB BRAZIL

ARGENBIO

Corporate Members



Back Up's

Way forward (1/2)

7 areas of joint actions between UIC and CropLife members

- Needs & benefits
(reach out & explain) *“Promote the need to control weeds along railway tracks as a fundamental security requisite to ensure passenger lives are not endangered by accidents linked to invasive weeds that impair visibility or compromise traction/braking. In parallel, explain the benefits of reliable, efficacious and sustained weed control throughout the year”*
- Stewardship
(new technology) *“Encourage adoption of technologies that ensure the correct use of herbicides, such as GIS-GIP to control application and avoid environmental contamination, minimize operator exposure, require training and certification of applicators and facilitate exchanges of best practices between countries. Aim to minimize pesticide use through better targeting and application technologies”*
- Regulatory
(implement) *“Develop modelling approaches with a European scope to ensure consistency of approach and the capacity to customize to country-specificities. Promote the adoption of this modeling approach by regulatory authorities”*

Way forward (2/2)

7 areas of joint actions between UIC and CropLife members

- Capacity building *“Transfer of technologies across countries, through Public- Private- Partnerships, like GPS-GIS system, weed detection technologies, modern spray equipment, LCA, etc”*
- Environment *“Work together to develop a better understanding of the possible environmental impacts of pesticide use on railways, how to quantify them and how to evaluate the risks they represent ”*
- Waste *“Best practice disposal of unused spray solution (Phytobac?) and use of in-line dilution or other means to ensure that excess spray is minimized. Advocate appropriate packaging solutions for railway, like IBC with close transfer system, to reduce operator exposure”*
- Innovation *“Investigate non-chemical methods of weed control, IPM options and use of novel herbicides and novel application technologies with reduced drift, reduced water needs, suitability to application at higher speeds and resistance management tools”*