Weed Control within the tracks of Deutsche Bahn AG - status quo and future prospects
2nd UIC International Workshop on Vegetation Management
In Germany the Use of Herbicides on Railway Tracks is forbidden in general

National Plant Protection Act:
- the use of Pesticides on Areas not used for agriculture, horticulture or forestry is forbidden
- this Definition includes Traffic Areas like Railway Tracks e.g.
- Exceptions are possible, if no reasonable measures are available and the environment will not be affected in a negative way

Registration of Plant Protection Products:
- The Registration Process of Herbicide Products for Railway Use includes special Demands due to the Construction of the Railway Track
The Application of Herbicides in Railway Tracks underlies different aspects.

Legal Frame and Product Registration

- Application of Herbicides in Railway Tracks in terms of "Good Practice in Plant Protection"
- General Permission by the National Railway Administration
- Protected Areas (incl. further Demands/Permissions)
- Contracts with qualified Service Providers
- DB Directives and Guidelines
- Operative Demands like Time Schedules, Track Construction, …
- … other Conditions like Rain, Wind, …

DB Directives and Guidelines

Operative Demands like Time Schedules, Track Construction, …

… other Conditions like Rain, Wind, …
The General Permission of the National Railway Administration take environmental demands of the Federal States into account (length: approx. 9,659 km)

<table>
<thead>
<tr>
<th>Water Protection Zone I (~ 35 km)</th>
<th>in general Railway Tracks are located outside the Zone I (Size: 10x10 m); in single Cases a Contact in the surroundings of Zone I may be possible.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ban of Herbicide Use in these Areas</td>
</tr>
<tr>
<td>Water Protection Zone II (~ 293 km)</td>
<td>the use of Herbicides is forbidden very frequently in single Cases applying for a permission depending on the regulations of the federal states</td>
</tr>
<tr>
<td>Water Protection other Zones (~ 5,622 km)</td>
<td>different Regulations concerning the Use of Herbicides in single Cases applying for a permission depending on the regulations of the federal states</td>
</tr>
<tr>
<td>Nature Conservation (~ 1,238 km)</td>
<td>the Use of Glyphosate Products (Leaf Herbicide) is forbidden in single Cases applying for a permission depending on the regulations of the federal states</td>
</tr>
<tr>
<td>FFH Areas (~ 2,471 km)</td>
<td>within aquatic Habitats the Use of Flazasulfurone and Flumioxazine (Soil Herbicides) have to be checked individually</td>
</tr>
</tbody>
</table>
The GIS-Data Set of protected Areas are processed via intersection with the Railway Network Data each Year.

Water Protection Areas
Nature Conservation Areas
NATURA 2000 Areas (aquatic Habitats)
Railway Network Data

Result is the mandatory Base for the Permission and Application of Herbicides.
The Spraying Train is used for Herbicide Application on approx. 46,000 Kilometers of the DB Network

Facts about Spraying Train/ Herbicide Application:

- Treatment of tracks in use only (once a year):
  - ~ 46,000 km by Train
  - ~ 10,000 km by Two-Way-Vehicle
- Max. Speed of
  - Train: 40 km/ h → ~ 200 km a day
  - Two-Way-Vehicle: 15 km/ h → 15 km a day
- Control Unit/ Cockpit of Spraying Train incl.
  - Monitor with GPS-Localization of Spraying Train in relation to protected areas
  - Manual Operation of Spraying System supported by IR-Sensor for Gravel Bed
In the last 10 Years the total Amount of Herbicides used is in the range of 80,000 kg per Year

**Herbicides used in 2015**

<table>
<thead>
<tr>
<th></th>
<th>Track Length [km]</th>
<th>Track Area [ha]</th>
<th>Total Amount [Liter resp. kg]</th>
<th>l/ km resp. kg/ km</th>
<th>l/ ha resp. kg/ ha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hebicides ¹), total</strong></td>
<td>57,480</td>
<td>29,826</td>
<td>82,900</td>
<td>1.44</td>
<td>2.78</td>
</tr>
<tr>
<td>Glyphosate</td>
<td></td>
<td></td>
<td>77,535</td>
<td>1.35</td>
<td>2.60</td>
</tr>
<tr>
<td>Flumioxazine</td>
<td></td>
<td></td>
<td>3,318</td>
<td>0.06</td>
<td>0.11</td>
</tr>
<tr>
<td>Flazasulfurone</td>
<td></td>
<td></td>
<td>549</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Nufilm P ²)</td>
<td>13,992</td>
<td>7,804</td>
<td>1,499</td>
<td>0.11</td>
<td>0.19</td>
</tr>
</tbody>
</table>

¹) Used Products: Tender GB Ultra, Glyphos Sypreme, Purgarol, Round Up Power Flexx (Switzerland), Chikara, Nozomi
²) adhesion promoter
Primary Developments of the near Future will focus on the Reduction of Herbicide amount applied – because non-chemical methods will not be available soon.

**Roadmap**

**Status Quo:**
GPS-Localization of Spraying Trains in Relation to Protect Areas (incl. manual Documentation of applied Herbicides)

- **2016:** GPS based automatic Documentation of applied Herbicides
- **2017 (planned):** Start of a Project with other German Railways evaluating different Weed Control Measures
- **2020 (planned):** Automatic Weed Detection triggers Herbicide Application
Questions? At all Times - contact:

Deutsche Bahn AG
DB Umwelt – CUM (N) Naturschutz
Dr. Michael Below
Caroline- Michaelis-Str. 5-11
10115 Berlin, Germany
Tel. ++ 49 30/ 2 97 – 5 65 40
eMail: Michael.Below@Deutschebahn.com

DB Netz AG
Fahrwegpflege und Sanierung I.NPF 11 (F)
Felix Gerhardt
Theodor-Heuss-Allee 5-7
60486 Frankfurt/ Main, Germany
Tel. ++ 49 69/ 2 65 – 3 17 35
eMail: Felix.Gerhardt@Deutschebahn.com

Many Thanks for Your Attention