

# 13<sup>th</sup> UIC Sustainability Conference



## Transport related risk of seed spillage of oilseed rape

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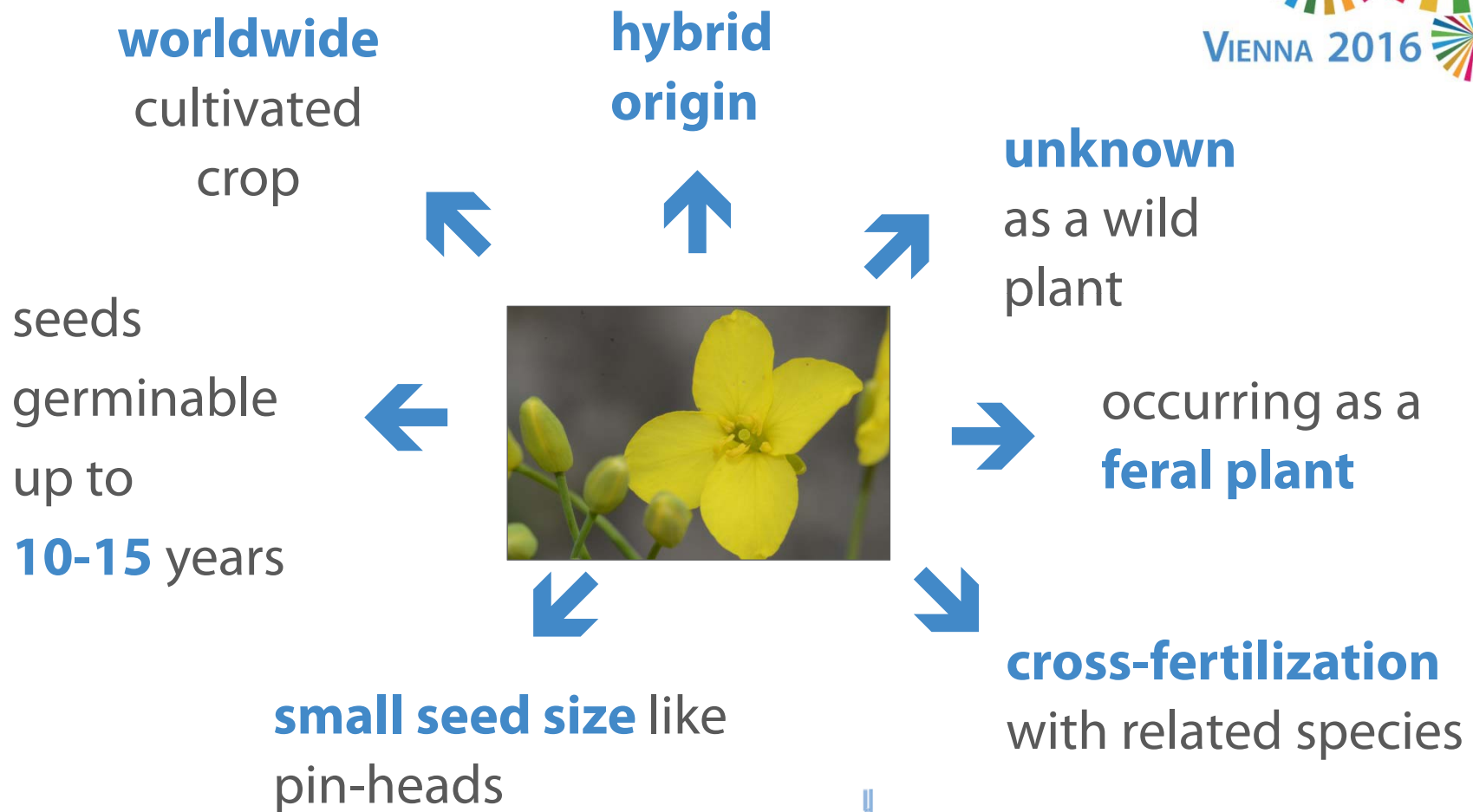


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12, 13, 14 October 2016

# Characterisation of oilseed rape (OSR)



# Cultivation and transport of OSR



- ❖ **GM HT OSR** grown in North America
- ❖ **Seed spillage** during transportation and handling activities is very frequent.
- ❖ **Transport and handling activities** as the main cause of unintended occurrence and subsequent establishment of feral GM OSR in countries without GM OSR cultivation (e.g. Japan, Switzerland)
- ❖ Reason for **import restrictions** in countries banning GM OSR cultivation (e.g. **Austria**)
- ❖ **Introgression of transgenes**: problems with weed management and compromising the integrity of genetic resources in wild relatives.





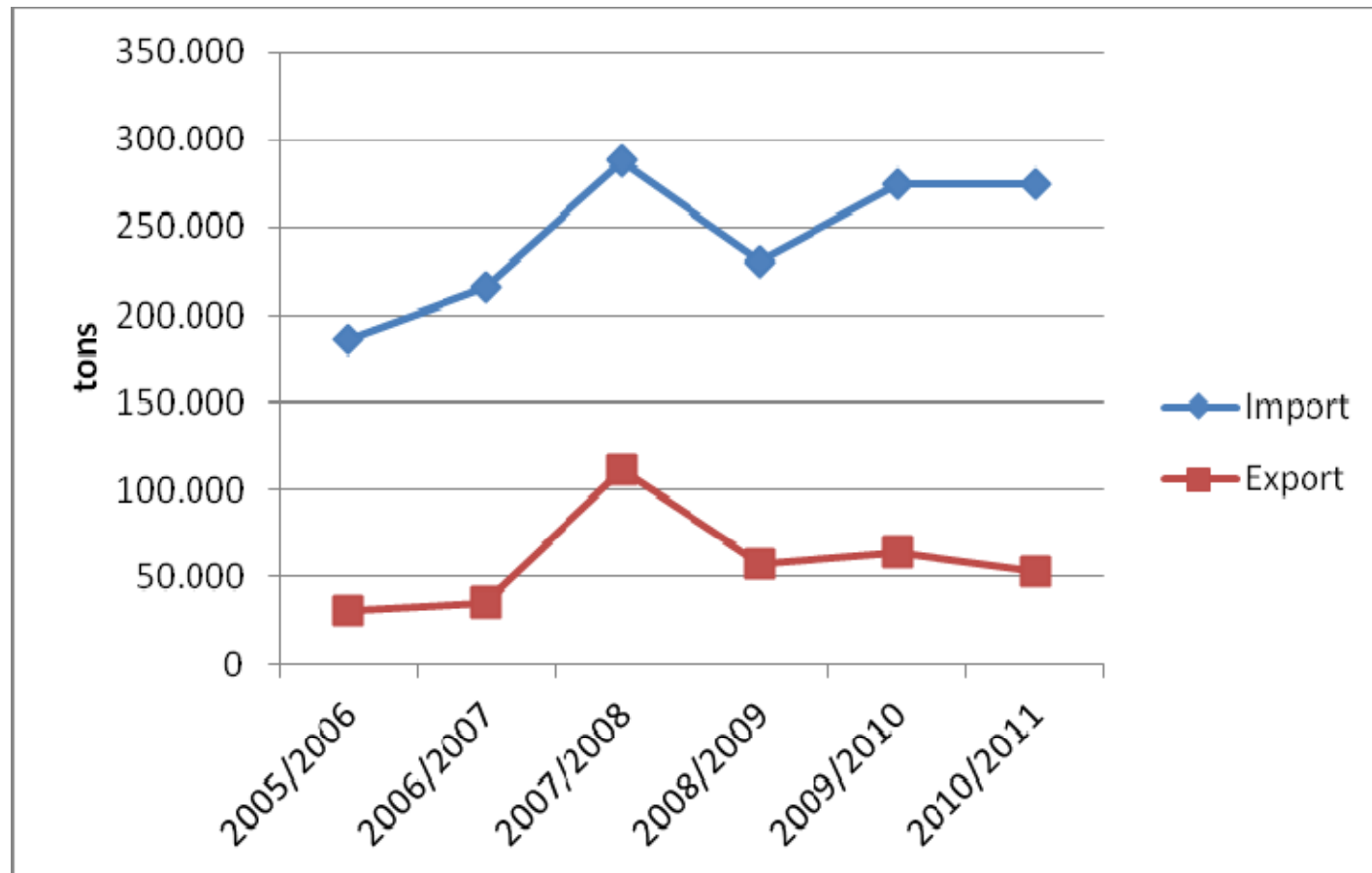
# Aims of the study

Survey of the abundance and frequency of feral OSR:  
assessment of the risk of establishment from  
non GM seed imports

- ✿ **Documentation** of seed spillage, establishment and distribution of transported viable OSR seeds in Austria
- ✿ **Collection** of field data and **genetic analyses**:
  - Selection of appropriate sampling-sites
  - Sampling and SSR analyses of plant material of altogether **2,113 OSR individuals** in 2014 and 2015
- ✿ **Assignment** to OSR gene pools of 37 varieties grown in Austria during the last 10 years and to EU variety pools (8)



# OSR import and export data from Austria



Source: Statistik Austria





# Transport of OSR seeds

✿ Ship



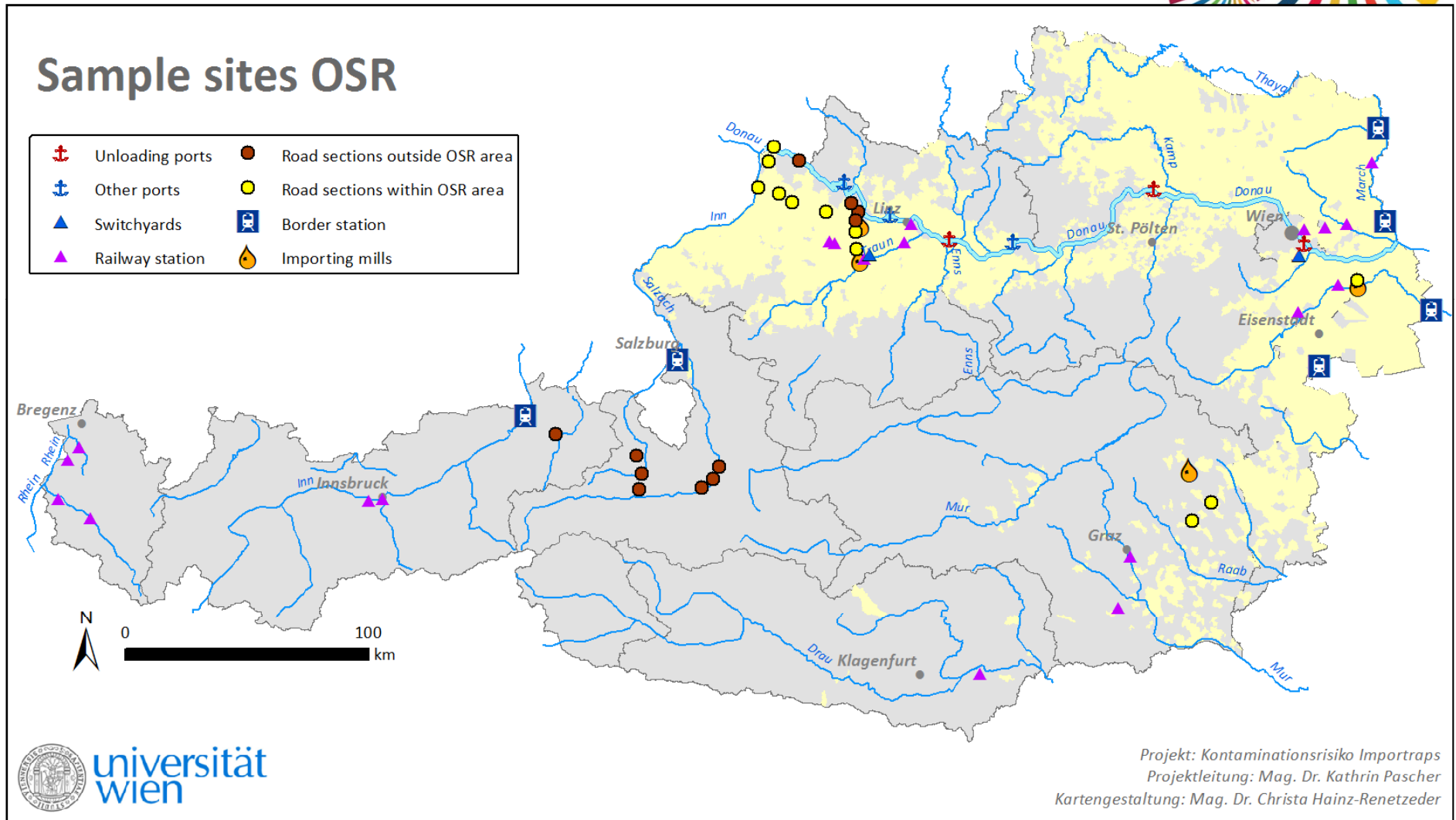
✿ Railway



✿ Road



# Locations of the 60 sample sites



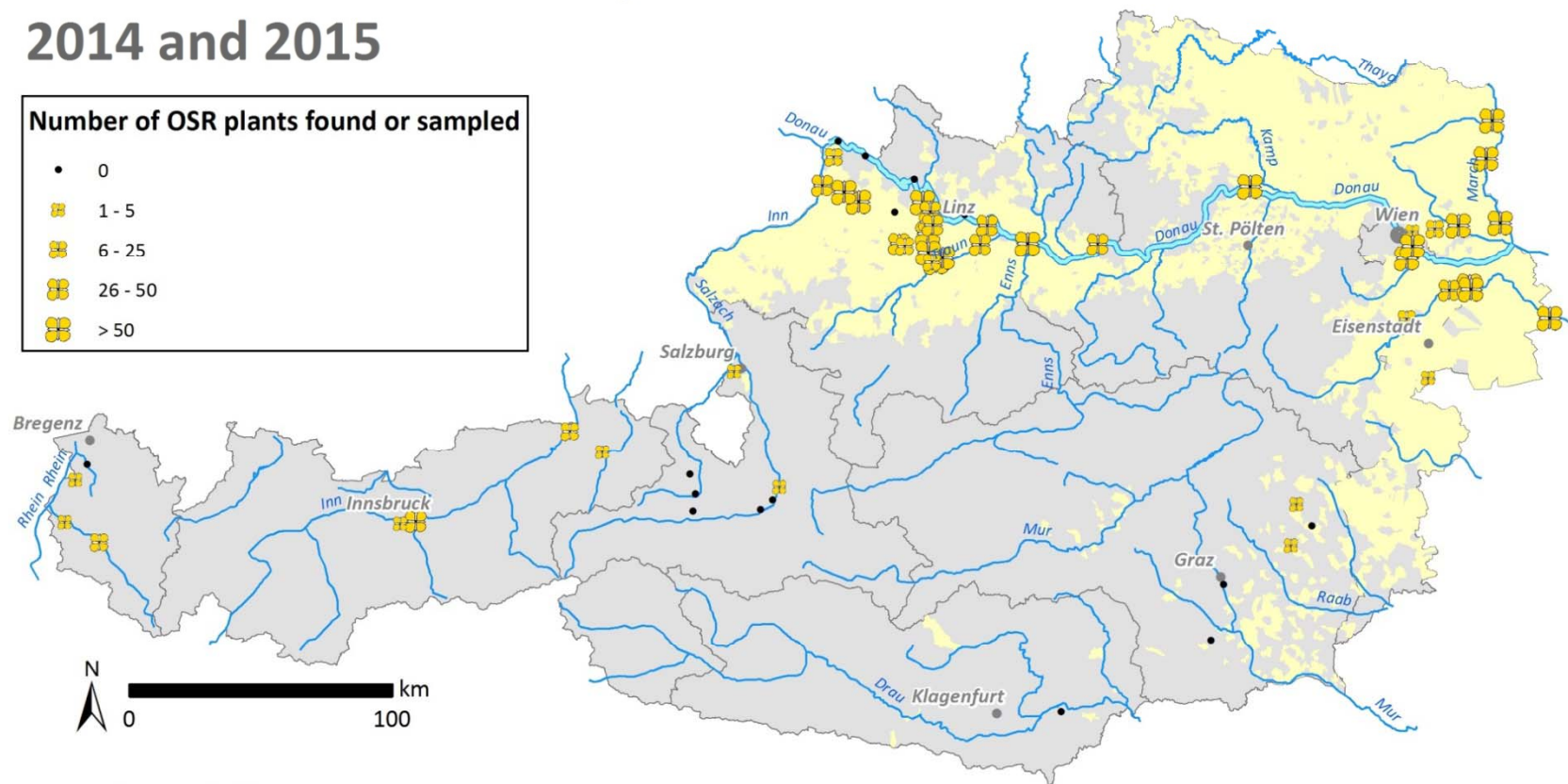
# Results: Occurrence and abundance of feral OSR in sample sites



## Occurrence of feral OSR plants 2014 and 2015

Number of OSR plants found or sampled

- 0
- 1 - 5
- 6 - 25
- 26 - 50
- > 50





# Results: Sampling locations at the switch yard of Kledering



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# Results: Vitality and habitats



☘ Most of the feral OSR plants exhibited **high vitality**.

**Railway lines** proved to be an ideal habitat for the  
☘ establishment of feral OSR.

**Persistence:** most of the OSR populations registered  
☘ in 2014 were still present at the same sites in 2015.





# Results: Ecological habitat spectrum of OSR



# Results: Origin and transport

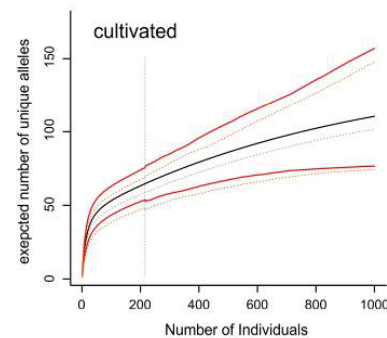
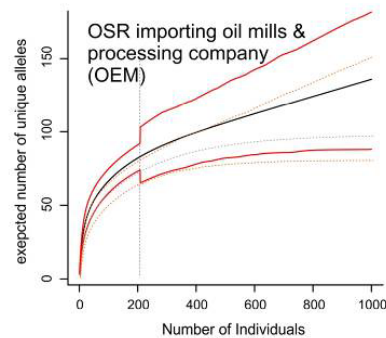
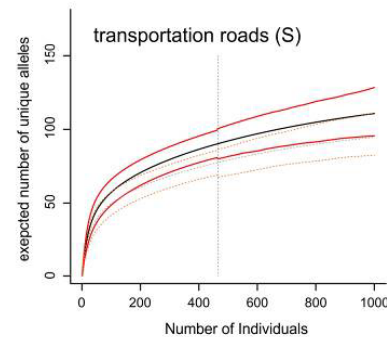
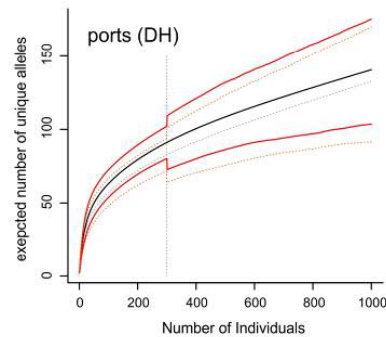
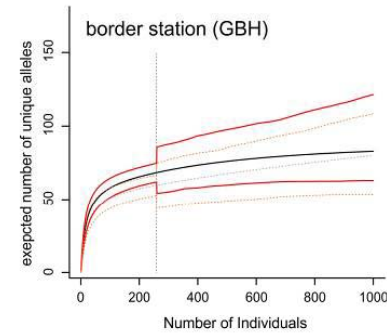
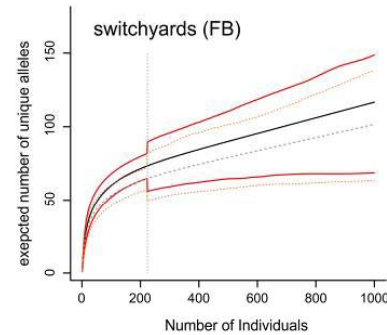
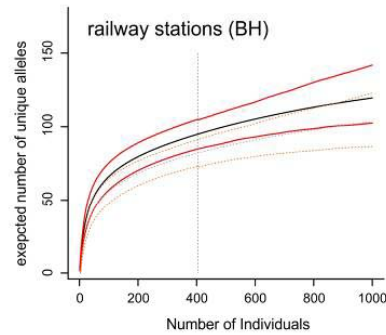


- ✚ OSR varieties exported to Austria as **bulk mixtures** all complying with quality standards
- ✚ **Identity of origin** of a variety unknown and traceability not possible
- ✚ Comparatively detailed data available for transportation *via ship*
- ✚ Only rough data concerning transport *via* railway and trucks
- ✚ Due to weak implementation of the polluter pays principle and incomplete cost calculations concerning external costs in the transport market, the rail transport sector lost most of its market shares to the **road transport sector**.





# Results: Genetic diversity



Pascher et al. (in prep.)





# Results: Sensitive links

Most sensitive links for seed spillage within the transportation and processing chain



- ❖ **Reloading and processing facilities of OSR**  
(e.g. ports, switchyards, oil mills)
- ❖ **Border railway stations e.g. to Italy:** different voltage used for running the trains (Austria 15 kV, Italy 3 kV).
- ❖ **Railway stations** (e.g. Innsbruck) where **defect trains** are repaired.
- ❖ Omitting of **controls at the Austrian borders**
- ❖ **Inadequate containment** of trucks
- ❖ **Insufficient cleaning measures of loading areas** of trucks and ships as well as goods wagons
- ❖ **Insufficient cleaning measures of processing facilities** (oil mills etc.)
- ❖ **Applied herbicide management**
- ❖ **Wheat imports** from Canada
- ❖ **Mode of transportation** of OSR seeds



# Results: OSR seeds often handled loosely



# Results: Preventing measures

## Measures to prevent spillage of imported GM OSR:



- ✿ mode of **seed packing** during transportation (loose transport, big bags, etc.)
- ✿ should concentrate on herbicide application and on alternative **weed management** (manual removal of single plants, spraying of organic herbicides)
- ✿ more **intense controls** at railway borders in Austria to prevent spillage due to inappropriate transportation facilities.



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all contacted Austrian oilmills

many helping hands



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# Thank you for your attention!

