# Transfer of wet-deposited radiocaesium and radiostrontium in spring oilseed rape and spring wheat

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## 1. Introduction

- Limited amount of information about deposition on growing crops.
- Data from the trial can be used to calculate transfer factors.

## 2. Objectives

- How depositing radionuclides in growing crop stand influence the concentration in edible parts.
- Degree of the influence is dependent on development stage, weather, and length of the time period prior to harvest.

## 3. Methods

- Conducted at an agricultural field at Uppsala, Sweden during growing season 2010 and 2011 (only year 2010 is presented).
- Analysed concentration of wet deposited $^{134}Cs$ and $^{85}Sr$ in seeds and grains on spring oilseed rape and spring wheat.
- The radionuclides were deposited at five different development stages using rainfall simulator.
- Dried biomass samples were measured for radioactivity with High-Purity Germanium (HPGe) detectors.

## 4. Results

| Crop | Radio-nuclide | Deposition event | (*n*) | Concentration ($\bar{x}$)±*S* (Bq kg$^{-1}$) | Transfer factor ($\bar{x}$) (m$^2$ kg$^{-1}$)×10$^{-4}$ |
|---|---|---|---|---|---|
| **Oilseed** | $^{134}Cs$ | 1 | 3 | 8±2 | 3.13 |
| **Oilseed** | $^{134}Cs$ | 2 | 3 | 127±114 | 47.3 |
| **Oilseed** | $^{134}Cs$ | 3 | 3 | 123±118 | 47.3 |
| **Oilseed** | $^{134}Cs$ | 4 | 3 | 89±14 | 33.4 |
| **Oilseed** | $^{134}Cs$ | 5 | 3 | 325±113 | 105 |
| **Wheat** | $^{134}Cs$ | 1 | 2 | 4±2 | 1.68 |
| **Wheat** | $^{134}Cs$ | 2 | 3 | 84±64 | 31.4 |
| **Wheat** | $^{134}Cs$ | 3 | 3 | 265±141 | 102 |
| **Wheat** | $^{134}Cs$ | 4 | 3 | 348±123 | 130 |
| **Wheat** | $^{134}Cs$ | 5 | 3 | 318±266 | 103 |
| **Oilseed** | $^{85}Sr$ | 1 | 2 | 6±6 | 1.42 |
| **Oilseed** | $^{85}Sr$ | 2 | 0 | n.d. | n.d. |
| **Oilseed** | $^{85}Sr$ | 3 | 1 | 20.52 | 4.98 |
| **Oilseed** | $^{85}Sr$ | 4 | 2 | 23±14 | 5.83 |
| **Oilseed** | $^{85}Sr$ | 5 | 3 | 248±94 | 49.7 |
| **Wheat** | $^{85}Sr$ | 1 | 1 | 4.32 | 1.03 |
| **Wheat** | $^{85}Sr$ | 2 | 0 | n.d. | n.d. |
| **Wheat** | $^{85}Sr$ | 3 | 2 | 75±40 | 18.3 |
| **Wheat** | $^{85}Sr$ | 4 | 3 | 165±45 | 42.7 |
| **Wheat** | $^{85}Sr$ | 5 | 3 | 560±427 | 112 |

## 5. Conclusions

- In both crops, the transfer of $^{134}Cs$ was generally higher than for $^{85}Sr$.
- Can be explained by difference in movability between the two radionuclides inside the plant.
- Transfer was higher for both radionuclides in spring wheat grains than in spring oilseed rape seeds.