

Derivation of herbicide strategies in sugar beet

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Introduction

The use of herbicides for weed control in sugar beet was continuously developed and optimized in the last decades. Splitting-applications and weed specifically adjusted application rates led to specific herbicide use in sugar beet in Germany. With the development of the NEPTUN-Surveys, treatment index (TI) for pesticide use was introduced in Germany. The TI allowed a comparison of the pesticide intensity among regions. Thus, differing pesticide strategies could be identified.

Material & Methods

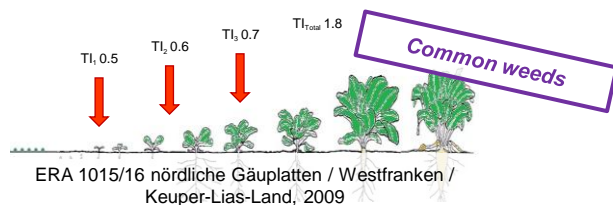
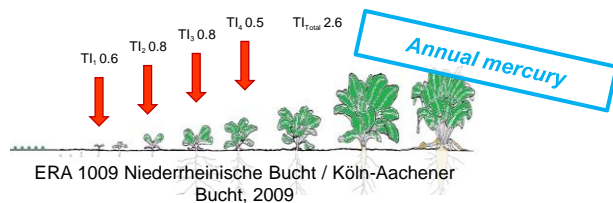
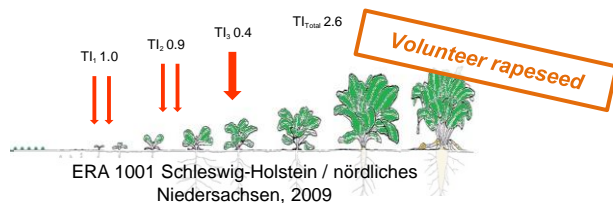
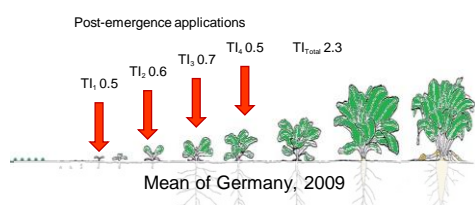


ERA: Survey Regions Agriculture; ROSSBERG ET AL. (2010); NEPTUN 2009 - Sugar beet

For the evaluation of strategies concerning herbicide use, data from the NEPTUN-Survey 2009 were taken (Network for the determination of the use of crop protection chemicals in different agricultural relevant natural habitats in Germany). The calculation of the treatment index was done field- and treatment-specific. TI_{Total} represents the mean value on a regional scale called ERA.

$$TI = \sum \frac{\text{Application rate [l kg}^{-1}\text{]}}{\text{Allowable rate [l kg}^{-1}\text{]}} \times \frac{\text{Treated area [ha]}}{\text{Area [ha]}}$$

Results



In Germany weed control in sugar beet is focused on post-emergence applications. On average, 3.7 herbicide treatments were applied with a TI_{Total} of 2.3 in 2009. The intensity of the treatments increased from the 1st application with a TI of 0.5 to 0.7 in the 3rd application. The 1st treatment was applied 15 days after sowing with a mean treatment interval of 12 days.

In ERA 1001 the TI was higher than the average. Overall, approximately 5 treatments were applied. On average, the 1st treatment was applied 15 days after sowing, but the treatment interval was 8 days. This was mainly influenced by the first two treatments which were split up again. The treatment interval between these treatments was relatively short.

ERA 1009 showed a relatively similar herbicide intensity as observed in ERA 1001. The treatment frequency (TF) was 3.7 on average and the 1st treatment was applied 16 days after sowing. The treatment interval was 12 days. The relatively high TI_{Total} resulted from a high number of pesticide products and active ingredients.

In ERA 1015/16 the lowest herbicide intensity with 1.8 was observed. 1st herbicide treatment was applied on average 17 days after sowing with a treatment interval of 13 days. A moderate herbicide input per treatment and the low TF resulted in the lowest TI_{Total} which was calculated in 2009.

Discussion

Herbicide strategies differed in the factors treatment index, treatment frequency, treatment interval, number of used pesticides and active ingredients per treatment. It turns out, that difficult to control weeds had a major influence on weed control strategies in sugar beet. Regions with weed infestations focused on annual mercury as in ERA 1009 required a higher number of pesticides and active ingredients per treatment at a mean level of the treatment frequency, which resulted in a higher treatment index. Weed infestations dominated by volunteer rapeseed as in ERA 1001 required a high treatment frequency in combination with a short treatment interval and less active ingredients per treatment, which also resulted in a higher treatment index. Regions with a lower proportion of difficult to control weeds had a lower treatment index, which arose by a lower treatment frequency, longer treatment interval and a mean number of pesticides and active ingredients as in ERA 1015/16.