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Relevance of Guttation as a Potential Water Source for Honey Bees in Neonicotinoid Seed-Treated Sugar Beet

1. PREFACE

In April / May 2009, 12 commercial sugar beet fields in a typical sugar beet growing area (North-Rhine, Germany) were surveyed over three to four weeks to evaluate the occurrence of guttation in sugar beet (Doc.-No.: M-354773-01-1).

The field survey was performed in the early morning hours (between 6.10 and 8.30 a.m.) at days with meteorological conditions which favour guttation and maximize the likelihood of detecting the phenomenon if it occurs (i.e. cold nights, low temperature and no rainfall).

The following parameters were recorded:

- Growth stage of the sugar beets
- Occurrence of guttation in sugar beet
- Occurrence of guttation in adjacent fields or off-crop areas
- Meteorological conditions (wind, temperature, sunshine, precipitation)

2. RESULTS

In total, 98 field visits took place between April 22 and May 19, 2009, covering growth stages from BBCH 10 (cotyledons unfolded) to 19 (9 and more leaves unfolded). Guttation could be regularly observed in adjacent grassland or cereals (65 out of 78 records outside the sugar beet fields = 83% of the visits). In contrast, at only one out of 98 sugar beet field visits, guttation was observable (= 1%). During another sixteen visits, droplets were encountered on sugar beet leaves. Since during these days, intensive dewfall prevailed, a differentiation between dew and guttation was not possible, but it can be reasonably assumed that the vast majority of droplets and overall moisture on the leaves can be attributed to dew.

3. CONCLUSION

The observations indicate that in sugar beet guttation occurs very infrequently when compared to other crops like cereals or maize. In 2009, Bayer CropScience conducted two field surveys, in Austria and France on guttation of maize seedlings (Doc.-No.: M-355018-01-1 and Doc.-No.: M-355020-01-1). In these surveys, guttation occurred very regularly (e.g. in Austria during 276 out of 331 observation days). Despite this regular occurrence of guttation and the occasional use of guttation fluid by honey bees, no adverse effects were recorded on the colony level for bee hives which had been exposed to these maize fields under worst-case conditions, i.e. no easily accessible water source and no nectar-producing crops in the hive vicinity.

Based on a comparable neonicotinoid seed loading (amount of a.s. per kernel), number of plants per area (10 - 13 seedlings / m²) and sowing period (time in the year when early growth stages are present) between maize and sugar beet, it can be concluded that the risk posed by guttation fluid of sugar beet seedlings to honey bees is negligible, as guttation occurs very infrequently in sugar beet and even frequently guttating maize seedlings showed no adverse effect on the development of directly exposed honey bee colonies.

4. SIGNATURE

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2009-09-04

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Environmental Safety Manager
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5. ADDITIONAL REFERENCES

Author(s)	Year	Title, Source, Company Name, Owner, Date Report-No., Document-No., published or not	Data protection claimed	Owner
[redacted]	2009	Guttation of Sugar Beet Seedlings Results of a Survey in a Typical German Sugar Beet Growing Area Owner: Bayer CropScience Date: August 31, 2009 Document-No.: M-354773-01-1 Unpublished	Yes	BCS
[redacted]	2009	Field Survey on Guttation of Maize Seedlings under Agronomic Use Conditions in Austria and Assessment of the Relevance of Guttation Fluid for Honeybees (Interim Report) Owner: Bayer CropScience Date: September 03, 2009 Document-No.: M-355018-01-1 Unpublished	Yes	BCS
[redacted]	2009	Interim Results from a Maize Field Study on Guttation of Maize Seedlings and Uptake of this Guttation Fluid by Honeybees in France Owner: Bayer CropScience Date: July 09, 2009 Document-No.: M-355020-01-1 Unpublished	Yes	BCS
[redacted]	2009	Guttation Monitoring of Maize Seedlings under Agronomic Use Conditions in Austria and Assessment of the Relevance of Guttation for Honeybees Owner: Bayer CropScience Date: September 03, 2009 Document-No.: M-355004-01-1 Unpublished	Yes	BCS