

Row application of insecticides and the use of green insecticides to achieve the goals of the Farm to Fork strategy

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Introduction

The European Commission announced two targets for pesticide reduction as part of the Farm to Fork strategy: 50% reduction in the use and risk of chemical pesticides and a 50% reduction in the use of more hazardous pesticides by 2030.

In this study other spraying techniques were investigated to improve the efficacy of contact insecticides to control green peach aphids (*Myzus persicae*) (fig. 1) and thus virus yellows in sugar beet, to enable the use of green insecticides. Furthermore, it was investigated if row application can reduce the amount of insecticides used compared to a broadcast spray.

Results

The combination of a Turbo TwinJet TTJ60 11003VP nozzle in a sideways direction in combination with the additive Silwet Gold led to the highest percentage of coverage of the spraying solution at the underside of the leaves (treatment 9) (fig. 2; table 1). With this spraying technique aphids could be controlled with contact insecticides, like pyrethroids (fig. 4). A reduction of 68% a.i., compared to a broadcast application, was achieved with the row application. The efficacy of Teppeki (flonicamid) and the systemic insecticide IRS 785 was not negatively affected compared to a broadcast application (fig. 5).

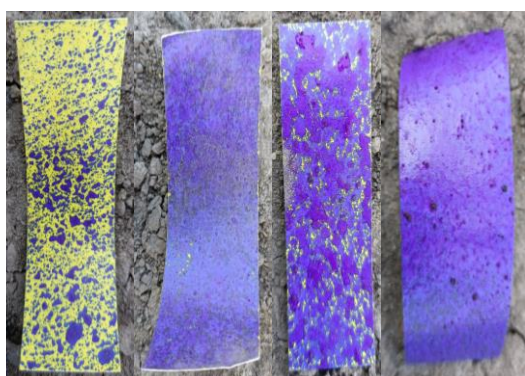


Fig. 2 Water sensitive paper was used to monitor spraying distribution. From left to right results from treatment 2, 4, 7 and 9 respectively.



Fig. 3 Red pigment was added to the spraying solution to monitor spraying distribution at the underside of the leaves.

Table 1 Percentage coverage at the underside of the leaf (Heijningen, 2023).

direction	nozzle type	additive	percentage coverage
1 downwards	TP6503E	-	0.2 d
2 sideways	Lemken AirMix OC2	-	13.2 c
3 sideways	Lemken AirMix OC2	2x spraying volume	19.0 bc
4 sideways	Lemken AirMix OC2	Silwet Gold (0.1%)	N/A
5 sideways	Lemken AirMix OC2	Actirob (3.0 L/ha)	22.6 ab
6 sideways	Lemken AirMix OC2	Promotor (0.5 L/ha)	17.5 bc
7 sideways	Turbo TwinJet® TTJ60	-	26.4 a
8 sideways	Turbo TwinJet® TTJ60	2x spraying volume	23.6 ab
9 sideways	Turbo TwinJet® TTJ60	Silwet Gold (0.1%)	N/A
10 sideways	Turbo TwinJet® TTJ60	Actirob (3.0 L/ha)	21.7 ab
11 sideways	Turbo TwinJet® TTJ60	Promotor (0.5 L/ha)	23.8 ab
Probability			< 0.001
LSD 5%			6.56

*Treatments with Silwet Gold could not be assessed due to discoloration of the red pigment. However, visibly this led to the highest coverage (see also fig. 2).



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Materials and methods

In 2022 and 2023 field trials were conducted. Trials were inoculated with *Myzus persicae*. Aphids were counted after application of insecticides. In trials with row applications, concentrations were kept equal between treatments.



Fig. 1 Green peach aphids hide at the underside of the leaves and are difficult to control with contact (green) insecticides.

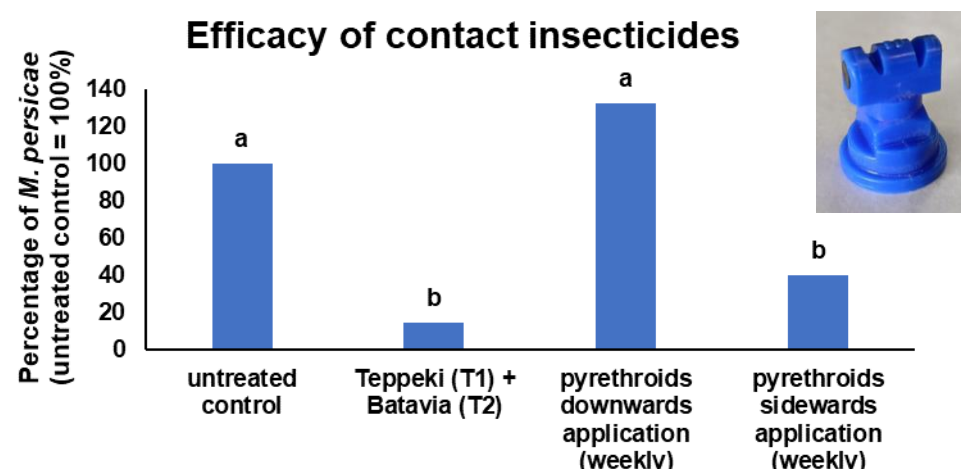


Fig. 4 Efficacy of contact insecticides (pyrethroids) with different spraying techniques to control green peach aphids (*Myzus persicae*) in sugar beet as a mean of 14 June 2022 and 26 May 2023 ($P < 0.001$; LSD 5% = 36.6).

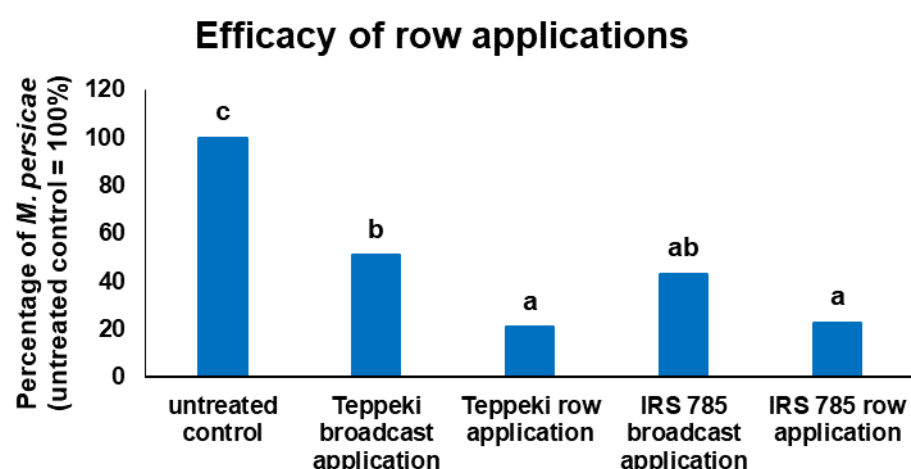


Fig. 5 Efficacy of broadcast and row applications of Teppeki and IRS 785 to control green peach aphids in sugar beet as a mean of 14 June 2022 and 26 May 2023 ($P < 0.001$; LSD 5% = 24.3).

Conclusions

Although not registered yet, sideways sprays in combination with a good nozzle and additive are a way of increasing the efficacy of contact insecticides, which opens possibilities for the use of green insecticides in the future. Row applications can be used to reduce the amount of systemic insecticides to control aphids and virus yellows.