Is an application with Dropleg^{UL} nozzles an alternative for the flower spraying in oilseed rape?

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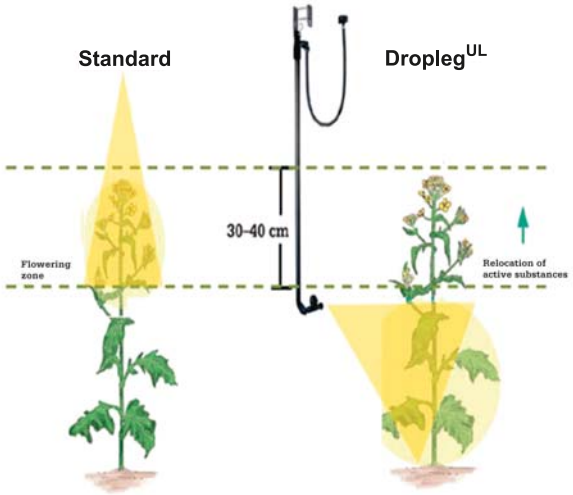
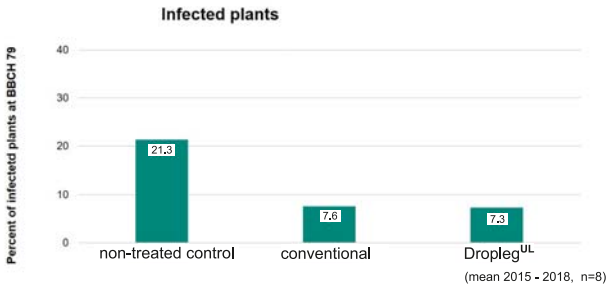
Introduction

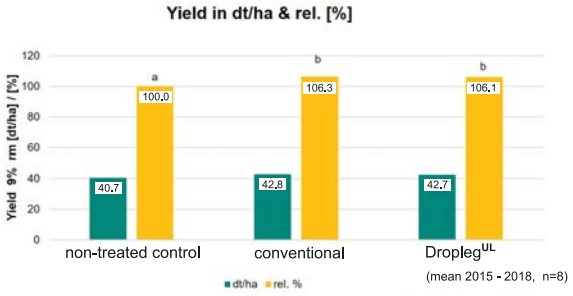
Treatment using fungicides on full flowering oilseed rape to protect against Sclerotinia sclerotiorum, the pathogen that causes the common disease Sclerotinia, is standard practice in modern farm management. However, this can affect insects such as honey bees and wild pollinators. Using the innovative Dropleg^{UL} technique for fungicide and insecticide application during the flowering stage in oilseed rape can reduce contact between insects and the active ingredient. The beneficial feature of the Dropleg^{UL} technique is that the spray nozzles hang below the flowering canopy. This can significantly reduce any residues of plant protection products in honey and bee products. Despite the advantages of the technique, its efficiency against Sclerotinia also has to be proven in practical situations.



Material and methods

At the University of Applied Science South Westphalia, field trials were conducted from 2015-2018 in cooperation with Deutsche Saatveredelung AG (DSV), ADAMA GmbH and Landwirtschaftskammer North-Rhine Westphalia with aimed at comparing the efficacy of the Dropleg^{UL} technique with conventional spraying techniques during the flowering stage of oilseed rape. Field trials were conducted in a randomized block design with two locations each year and three variants (Dropleg^{UL}, conventional treatment above the flowers and a non-treated control). The fungicide Custodia (200 g/l Tebuconazol and 120 g/l Azoxystrobin) was applied during the flowering stage of the oilseed rape.
To ensure infestation with Sclerotinia, artificial inoculation with a cultured pathogen brood took place in 2015 and 2016. This was applied during full flowering. Parallel to the pathogen brood production, several laboratory tests took place to optimize and develop pathogen brood production. Cereal grains of spring barley, winter wheat, rye and spring oat were examined as carrier material. Two different containers - plastic bags and buckets with a breathable lid - were also tested. In addition, the grains were treated differently before vaccination with the pathogen.
An additional test examined the impact on maturation using the different application techniques. Different procedures have been developed to prove objectivity. The maturity stage of the pods and the stubble was measured and categorized in a scoring scheme. Further tests to measure the dry mass of the stubble and the oil content of the seeds were performed in the laboratory.





Results

The efficacy of the Dropleg^{UL} technique against the fungal disease Sclerotinia was shown to be comparable to conventional application above the flowers. The number of infected plants was significantly reduced compared with the non-treated control and on the same level as the conventional application system. There was no difference in the yield between the Dropleg^{UL} application technique and the conventional application technique. However, both treated variants differed significantly from the non-treated variant. The fastest and strongest carrier material for the pathogen brood was grains of rye and winter wheat in plastic bags.
The oil content of the seed varied widely between all variants. The Dropleg^{UL} variant had a significantly lower oil content than the conventional variant. In general, the dry mass of the Dropleg^{UL} stubble was the highest compared with the other variants. Plants treated with Dropleg^{UL} appeared to stay green longer, due to accumulation of the active ingredient on the stem.

Discussion

In today's fast-paced agricultural environment, there is a high demand for new technologies and innovations. Dropleg^{UL} application is a technique that might help to reduce the conflict between beekeepers and farmers. Dropleg^{UL} reduces the exposure of bees to pesticides by simply lowering the nozzles under the level of the flowers.
The Dropleg^{UL} application technique requires further testing so that a stable and sustainable technology can be developed for the future. For example, the results of the maturity characteristics clearly show that plots treated with Dropleg^{UL} have a delayed senescence. Additional testing of the reduction of active ingredients also needs to be performed to ensure the effectiveness of the Dropleg^{UL} application system.