Grower Summary

SF 169

Field evaluation of natural plant elicitors with or without a reduced fungicide programme for control of botrytis in blackcurrants and effects on yield and quality parameters

2019 Final Report

Project title:	**Field evaluation of natural plant elicitors with or without a reduced fungicide programme for control of botrytis in blackcurrants and effects on yield and quality parameters**
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Project leader:	Dr A M Berrie, NIAB EMR
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Key staff:	Dr A Berrie Dr R Saville
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Industry Representative:	Harriet Prosser
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[The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.]

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Dr Angela Berrie

Research Leader

NIAB EMR

Signature ..... Date .....

Report authorised by:

[Name]

[Position]

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GROWER SUMMARY

Headline

- AHDB9916 shows some promise as an alternative to traditional fungicides for Botrytis control in blackcurrant.

Background and expected deliverables

Blackcurrant production in the UK occupies an area of around 2,552 ha, producing a total tonnage of around 15,700 tonnes, which in 2018 had a farm gate value of approximately £22 million (Defra Horticulture Statistics). Much of the crop is currently grown on contract for processing, Botrytis fruit rot (*Botrytis cinerea*) is by far the most important disease problem which seriously compromises fruit quality at harvest. The fear of rapid degeneration of ripening fruit due to developing fungal infection as fruit ripens causes growers to pick fruit prematurely before optimum sugar (BRIX) and colour have developed. Losses after harvest are minimal as the fruit, if not rapidly processed, is stored frozen. Unlike *B. cinerea* infection on strawberry and raspberry, infection of blackcurrant flowers can result in flower abscission (McNicol & Williamson, 1989) and significant yield loss, so control of the disease during flowering is vitally important. Fruit infection usually occurs via the flowers where the fungus can remain latent until the fruit matures, when, under conditions of high humidity, rapid colonisation of the fruit can occur (Xu *et al*, 2009).

Fungicides are currently relied on for control and are applied routinely during flowering and fruit development (Jorg *et al*, 2003; Walter *et al*, 2007), especially in wet seasons. Intensive use of fungicides in this way is undesirable and unsustainable and may result in residues in the fruit. In 2010 a Defra Horticulture LINK project (HL01105) was initiated with the main objective of developing new management methods for key pests and diseases of blackcurrants, giving priority to alternative, biological methods, and integrating them into an Integrated Pest and Disease Management system (IPDM). *Botrytis cinerea,* was the main disease target in the project. The use of biocontrol agents (BCAs), either alone or as part of an integrated programme with fungicides, offers a means of achieving good control of *B. cinerea* while minimising residues in the fruit. Similarly, alternative chemicals such as elicitors which stimulate resistance mechanisms and increase host resistance to diseases, also offer an alternative. BCAs were evaluated in trials over three seasons. However, the BCAs were only effective in reducing botrytis in one of the three years. In addition, they were expensive compared to fungicides making their use uneconomic in blackcurrants, particularly with the unreliability of performance.

In the trial in 2013, a natural product AHDB9916 (plant strengthener), based on flavonoids, gave comparable control of Botrytis rot compared to the standard fungicide programme on cv. Ben Tirran at a third of the cost. Further work on AHDB9916 was conducted in 2014. However, winter 2013/2014 was relatively mild which resulted in insufficient chilling for blackcurrants especially cv. Ben Tirran. Consequently, bush development was very variable and yield also poor. Results in 2014 were therefore inconclusive. Further trials are needed to properly assess the effect of AHDB9916 on fruit rots and other crop parameters and particularly consistency of performance.

Summary of the project and main conclusions

In 2017 in a replicated small plot trial, the effect of the biostimulants AHDB9916 and AHDB9915 and a plant extract AHDB9957 on the botrytis incidence in flowers and fruit on cvs. Ben Hope and Ben Tirran, was compared to that of a standard fungicide programme and an untreated control in a blackcurrant plantation, located at NIAB EMR. There were several practical issues which affected the performance of the two cultivars and the outcome of the trial. Late frosts in April and May resulted in poor fruit set in Ben Hope and the mild winter resulted in insufficient winter chilling in Ben Tirran, which resulted in the poor performance of the cultivar. In addition, a late infestation of spotted wing drosophila in the Ben Tirran fruit at harvest, resulted in the rapid deterioration of the Ben Tirran fruit in the post-harvest test and poor expression of botrytis in the fruit. There were no significant effects of treatments on any of the assessed parameters in Ben Hope. There was significantly less botrytis recorded in the fungicide treated fruit in green fruit tests in Ben Tirran and significantly less botrytis recorded in the fungicide-treated fruit and the AHDB9916 treated fruit in the post-harvest tests. However, as the incidence of botrytis rot in the post-harvest tests was very low (1-5%) these results should be treated with caution. In 2018, the trial was repeated at NIAB EMR with the same treatments. An additional treatment was included where AHDB9916 was applied to the same plots as in 2017, as the effects of this product are reported to be cumulative and such effects have been observed in trials on apples. AHDB9916, with or without the addition of the wetter Wetcit, was applied from pre-flowering at 3-4 week intervals, reaching a total of 3 sprays. AHDB9915 was applied from pre-flowering at 2 week intervals, with a total of 6 sprays and AHDB9957 were applied from pre-flowering at 7-10 day intervals, a total of 6 sprays. The fungicide treatment was applied from first flower at 7-10 day intervals, a total of 3 sprays. A similar trial was also conducted on a commercial plantation of blackcurrant cv. Ben Tirran, located at Rosemary Farm, Flimwell, Kent, by kind permission of Peter and Michael Reeves. At this site the effects of AHDB9916 alone or with a standard fungicide programme was compared with a

standard fungicide programme and an untreated control. Treatment applications were similar to those at NIAB EMR. Fruit set was recorded and the incidence of botrytis assessed on flowers, green fruit and mature fruit pre-harvest. In addition, 300 fruit were harvested from each plot, weighed to give a measure of fruit size, and then incubated in high humidity and assessed after seven days for botrytis and other fruit rots.

Despite favourable wet weather during flowering at both sites the incidence of botrytis in green fruit was very low. The subsequent weather in June and July was hot and dry and not favourable for botrytis spread and development. Botrytis incidence in flowers and fruit pre-harvest and in post-harvest tests was also low, although at the Rosemary Farm site there was significantly less botrytis in fruit from AHDB9916 only treated plots compared to the standard fungicide plots. However, little importance can be placed on this result because of the low incidence of botrytis. There was no effect of treatments on fruit set and fruit size at either site.

Unfortunately, the low incidence of botrytis in the fruit at both sites makes it impossible to come to any firm conclusions on the effect of alternative treatments on botrytis fruit rot.

Financial benefits

AHDB9916 gave promising results in control of botrytis in one trial and was also a third of the cost of the standard fungicide programme. This product shows great promise as an alternative approach to fungicides but further trials are needed to evaluate the consistency of performance and possible benefits on yield.

Action points for growers

- As there have been no clear results over the two years due to various practical difficulties such as lack of disease, it is not possible to offer any clear action points.