Grower Summary

The Bedding and Pot Plant Centre – new product opportunities for bedding and pot plant growers

PO 019d WP2

Final report

© Agriculture and Horticulture Development Board 2023. All rights reserved

Project title:	The Bedding and Pot Plant Centre – new product opportunities for bedding and pot plant growers. Work Package 2. Spray application
Project number:	PO 019d
Project leader:	Dr Jill England, ADAS Boxworth
Report:	Final report, 31 March 2023
Previous report:	None
Key staff:	Dr Jill England (ADAS), Technical Director, Head of Horticulture David Talbot (ADAS), Senior Horticulture Consultant Clare Butler Ellis (Silsoe spray application unit)
Location of project:	RSK ADAS Ltd, Battlegate Road, Boxworth, Cambridgeshire, CB23 4NN
Industry Representative:	Chris Need
Date project commenced:	1 April 2020
Date project completed (or expected completion date):	31 March 2023

© Agriculture and Horticulture Development Board 2023. All rights reserved

DISCLAIMER

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

© Agriculture and Horticulture Development Board [2020]. No part of this publication may be reproduced in any material form (including by photocopy or storage in any medium by electronic mean) or any copy or adaptation stored, published or distributed (by physical, electronic or other means) without prior permission in writing of the Agriculture and Horticulture Development Board, other than by reproduction in an unmodified form for the sole purpose of use as an information resource when the Agriculture and Horticulture Development Board or AHDB Horticulture is clearly acknowledged as the source, or in accordance with the provisions of the Copyright, Designs and Patents Act 1988. All rights reserved.

All other trademarks, logos and brand names contained in this publication are the trademarks of their respective holders. No rights are granted without the prior written permission of the relevant owners.

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.

David Talbot

Senior Horticulture Consultant

ADAS

Signature Date: 09.05.23

Dr Claire Butler Ellis

Research Manager

Silsoe Spray Applications Unit Ltd

Signature Date: 09.05.23

Report authorised by:

Dr Jill England

Technical Director, Head of Horticulture

ADAS

Signature Date: 09.05.23

© Agriculture and Horticulture Development Board 2023. All rights reserved

Grower Summary

Headline

- Reducing the applied volume with a spray pistol from a target of 1000 L/ha to 500 L/ha could result in a 30% increase in the quantity of active substance retained on the crop.
- Both spray pistols and nozzles affect flow rate hence the importance of calibrating each spray pistol and nozzle.

Background

The Bedding and Pot Plant Centre (BPPC) has been established to address the needs of the industry via a programme of work to trial and demonstrate new product opportunities and practical solutions to problems encountered on nurseries.

This is the Bedding and Pot Plant Centre report for:

Objective 2. Spray application.

This programme of work focuses on improving the application of plant protection products (PPPs) for bedding and pot plants through evaluating alternative approaches to existing hand-held high-volume systems, to improve the quantity, uniformity, and distribution of PPPs over plants.

Summary

Two case studies were agreed to base the project on: aphids on *Primula* and downy mildew on pansies. A review of the products used for these pests and diseases showed that an application of 200 – 400 L/ha using a medium spray quality would allow compliance with label recommendations and would be expected to give good efficacy.

An initial experiment at a host nursery evaluated the performance of a standard Ripa nozzle and spray pistol, in terms of the quantity deposited on plants and other spray collection materials, the uniformity of distribution over the beds and the speed of application. The bed width was 3 meters, and the target volume was 1000 L/ha.

Following this, some laboratory tests screened alternative approaches, including a battery-operated air-assisted knapsack sprayer, hydraulic off-set nozzles that are designed to deliver an even distribution over a defined width as well as a Ripa system with a lower flow rate. The potential for improvements of these approaches was considered, and equipment to be compared in a second field trial was identified.

© Agriculture and Horticulture Development Board 2023. All rights reserved

The ‘OC nozzles (Teejet Technologies) did not allow an adequate distribution of spray to be achieved, compared with the current industry approach, without significant further work considering pressure, release height and angle, and technique for deployment. The Birchmeier A1200 with TeeJet AITXA 80-03 nozzle as tested delivered very large droplets and a very low flow rate so did not meet our application criteria and has the potential for very poor application.

The second field trial therefore aimed to compare the 1000 L/ha application with a Ripa system with one with a lower flow rate which would deliver a volume of around 500 L/ha. The Birchmeier A1200 was also included to gain some information about its practical usage under more realistic conditions.

During calibration of equipment for the second trial, it was found that the flow rate of the Ripa system was a function of both the nozzle size and the pistol itself. The host nurseries pistol had different dimensions from the one purchased for the project and gave a much higher flow rate (Figure 1), particularly when fully closed. While only changing the nozzle was anticipated (from 2.0 mm to 1.5 mm) to reduce the flow rate, in this case we changed only the spray pistol.

Figure 1. The two pistols for the Ripa nozzles – left hand, the original one used at the host nursery; right hand side, the newer one purchased by Silsoe spray application unit (SSAU)

This reinforces the need for calibration under the conditions that the spray pistol will be used, rather than relying on standard flow rate charts. The original Ripa flow rate was less

© Agriculture and Horticulture Development Board 2023. All rights reserved

repeatable, particularly in the closed position, so it is necessary to calibrate each time it is used.

It is well documented that high water volumes result in lower retention of applied spray by the crop. In this study we have shown that reducing the applied volume with a spray pistol from a target of 1000 L/ha to around 500 L/ha could result in a 30% increase in the quantity of active substance retained on the crop. This was achieved with a Ripa spray pistol with a 2.0 mm nozzle in the fully closed position, which gave a flow rate of 4.16 L/min resulting in a spray volume of 533 L/ha, compared with the original system which had a flow rate of 7.2 L/min and an applied volume of 918 L/Ha.

Ripa nozzles and pistols produce a good droplet size and offer a low-cost approach for those wishing to reduce volumes and improve their spray application. Reducing volume in this way could also improve the work rate slightly by reducing the filling time of the spray tank but would not speed up the application process.

Financial benefits

A typical spray programme applied to a pansy / *Primula* crop at 500 L/ha instead of 1000 L/Ha is likely to result in savings of £67/Ha per crop. Greater savings will be made where products that are applied at a rate per litre (e.g., Majestik) rather than a rate per hectare are used (e.g., Amistar (EAMU 3388/18).

Lower water volumes offer many benefits including reduced down time spent filling the spray tank.

Action points

- Spray booms are better able to deliver lower volumes more uniformly than handheld systems. Therefore, growers that cannot move away from handheld application should consider transitioning to small handheld booms where possible.
- Where booms are not a feasible option, we would recommend using a traditional handheld system to deliver no more than 500 L/ha.
- Aim to reduce water volumes to improve spray retention on the crop and the retention of active substance by the crop.
- Calibrate existing spray pistols and nozzles at various settings and pressures to determine how you reduce water volumes with existing equipment.
- Use lower flow rate Ripa systems (e.g., smaller nozzle sizes) if you want to reduce volumes.
- Increase your margins by reducing water volumes.

© Agriculture and Horticulture Development Board 2023. All rights reserved