

Precision Band Spraying

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ABSTRACT

Band spraying has been practised in the past principally to target weeds but its use, to date, has been limited due to low productivity and difficulties in manually steering a band sprayer through a crop. In crop structures such as tree and bush crops the technique is relatively simple however in vegetable or arable crops it has proved more challenging as these require a higher degree of precision in guidance of the banded spray and requires crops to be planted in clearly defined rows. Often in such crops, row widths have been narrow and irregular however with the increased adoption of precision sowing using GPS satellite navigation it is now possible to spray in bands between crop rows to within 2-3cm accuracy using GPS guidance with real time kinematic (RTK) correction from a ground based mast. Similarly there exists vision guidance systems using forward mounted camera's to identify crop rows that can deliver comparable accuracy. Both guidance systems can therefore be used to steer a band sprayer through a narrow planted crop. In combination with GPS guidance the development of shielded spray hoods allows for the precise application of non selective herbicides to avoid contact with adjacent crops.

The benefits of band spraying are logical as weeds can be targeted more accurately in the inter row and a wider range of herbicides can be used particularly early season which can reduce dependence on the use of selective herbicides. In addition a band sprayer can also be used to deliver fertiliser, fungicides or insecticides directly over the row targeting these products more effectively with obvious economic and environmental benefits overall.

Two tractor mounted band sprayers, the Micron Varidome S1 and S3, have therefore recently been developed to fully utilise the potential benefits of precision band spraying using GPS or Vision guidance. These sprayers are currently available with 3m and 6 m wide toolbars with wider variants in development and can be front or rear mounted. Each uses a number of adjustable spray shields mounted on individual carriages with parallelogram and ground following wheel for independent operation. Two types of spray shield are offered; one with low volume CDA (Controlled Droplet Application) rotary atomisers and the other with pressure nozzles. This allows different spray volumes and band widths from 10-80cm to be used and maintains each individual spray shield in close contact with the ground to minimise spray drift. In addition these sprayers can also be equipped with a second spray line for over the row applications using a dual tank system for simultaneous applications. Various tanking options are available and the modular design of the sprayer implement allows configuration to different crop plantings according to planting distance, band width and number of rows.

These sprayers are now in commercial use in vegetable and arable crops where up to 40 ha per day have been sprayed and early experience is discussed. Research has also been undertaken in a wind tunnel to assess spray drift with shielded sprays and initial results indicate spray drift can be significantly reduced making them appropriate as a drift reducing technology (DRT).