IMIDACLOPRID APPLICATION – MEASUREMENT OF APPLIED DEPTHS

BY MATT SCHEMBRI, ADOPTION OFFICER, SRA MACKAY

In SRA's Spring 2019 edition of CaneConnection, SRA Weeds Agronomist Emilie Fillols reported on trials that showed runoff losses of imidacloprid were minimised if the liquid imidacloprid was placed at least 100mm deep and covered with soil, as per the label instructions. The key message is that imidacloprid, if placed correctly, has a low chance of being transported into local waterways. Therefore, the continuing detection of imidacloprid in waterways adjacent to sugarcane growing land suggests that the imidacloprid is not being placed correctly.

With a view to gain an appreciation of the effectiveness of current machinery to achieve the recommended depths, SRA has commenced measuring application depths of imidacloprid. To date only stool splitter liquid imidacloprid applicators have been examined. We have looked at dedicated imidacloprid units and imidacloprid/fertiliser units consisting of coulters and double disc openers or double disc opener only assemblies.

After application of the liquid imidacloprid it is difficult to clearly identify the liquid imidacloprid in the soil. Therefore, the approach taken has been to confirm that the liquid imidacloprid was being directed to the bottom of the double disc opener slot, and subsequently measuring the depth of the slot. Two measurements were taken: depth of the double disc opener slot (application depth), and depth of covering soil in the slot (covered depth), as shown below in image one. Note also that measurements were taken relative to the soil surface: i.e. any trash blanket or mill mud/compost was removed prior to depth measurements.

The double disc openers were found to be able to achieve the recommended 100mm application depth, as long as the implement was set correctly.

In many cases, while the applicator averaged 100mm depth, measurements fluctuated around the average due to inconsistent stool height relative to the inter-row space. The depth wheels running in the inter-row spaces effectively set the depth of the double disc openers, so as stool height varied so did application depths as shown in the graph. Applicator unit one (as shown in the graph) was operating in a paddock with inconsistent stool height, and as a result the measured application depths varied from 60mm to 160mm, while applicator unit two was working in a paddock with consistent stool height and consequently had less fluctuations in the depths (100mm – 140mm). Note for both units the average depth across the measurements was greater than 100mm: i.e. for applicator unit one the average depth was 111mm and for applicator unit two the average depth was 114mm.

A key message was that operators reported it was important to check the application depths in each paddock and adjust the depth wheels to achieve 100mm application depth.

The implements with covering devices after the double disc openers (e.g. StoolZippa, press wheels) were found to consistently achieve covered depth equal to application depth. This generally did not occur for implements without covering devices or with relatively simple covering devices such as a chain. We also found that for implements without covering devices, soil type impacted depth of cover. For example, in gravelly soil conditions the soil flowed into the slot giving complete coverage, whereas if the soil had reasonable clay content or was damp, then coverage was inadequate.

Placement of the imidacloprid in the slot is also important. The imidacloprid nozzle must be directed at the bottom of the double disc opener slot so that the jet of imidacloprid hits the bottom prior to soil flowing around the discs and covering the slot. We have observed that at times the nozzle gets bent backwards and as a result the imidacloprid is directed into the soil flowing around the discs which means that the applied imidacloprid is too shallow.

It is difficult to clearly identify the liquid imidacloprid in the soil after application. Therefore, we have recently commenced work using fluorescent dye added to the imidacloprid solution to identify the location of the applied imidacloprid. The imidacloprid and dye were applied using a double disc opener set to achieve 100mm depth with the nozzle directing the liquid at the bottom of the double disc opener slot. As shown in this example, the imidacloprid has collected at the bottom of the slot as expected. Further work is continuing to check if the double discs could potentially transport some of the imidacloprid toward the soil surface. ■

The work reported above is part of a new SRA-led project aimed at the best practice use of imidacloprid so as to ensure the industry's ongoing access to imidacloprid as a control for cane grubs. The project will consider all aspects of stewardship of imidacloprid. This includes, for example, the determination of when to use the chemical, calibration, application (including section controls) and correct placement, and using the chemical only for grub control. The project is a collaboration between SRA, the Queensland Department of Agriculture and Fisheries, CANEGROWERS, the Australia Cane Farmers Association, Bayer and NuFarm. It is funded by the Queensland Government Reef water quality program through the Enhanced Extension Coordination in the GBR project.

***(Below top left):** Measurements taken for imidacloprid application. **(Below top right):** Measured application depths for applicators working in two different paddocks. **(Below bottom left):** Image of imidacloprid jet directed at the bottom of the double disc opener slot prior to soil covering the slot. **(Below bottom right):** Example of tracking the applied imidacloprid using fluorescent dye.*