When to burn and when not to burn. Burning as a tool for snail control.

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Key messages

Windrow burning can reduce small pointed snail populations by over 90%. If there are weeds or fallen stubble that are not burnt then snails can still be present in the paddock.

Aims

To determine the impact of stubble burning on snail populations in a canola and barley paddock

Method

Two trials were conducted on a canola and barley paddock on the same farm, one kilometre apart. The paddocks were harvested in December 2015. In the canola paddock, standing stubble was swathed in January 2016. In the barley paddock a hay rake was used to rake all of barley chaff into windrows in January 2016.

In both paddocks, swaths were on the ground. In the canola paddock there was no fallen stubble or weeds on the inter-rows. Conversely both fallen stubble and weeds were present in the inter-rows in the barley paddock.

Pre-burn assessments were done 11th March 2016, paddocks were burnt 19 March 2016 and post-burn counts were done 21st March 2016.

In canola:

Along 2 windrows, 2 metres from the start of the windrow, at every second metre for 20 metres of each windrow, one metre square of windrow was removed and all snails on the ground were removed. The total number of live and dead snails was counted. The snails were considered live if they moved on moistened paper towelling within 24 hours.

Five days after windrow burning, the same windrows were sampled. This time sampling started at 22 metres from the end of the windrow to avoid areas already sampled. One metre square of burnt windrow was removed, every second metre for 20 metres. At each sample point, one metre square of inter-row stubble, 2 metres away, was also removed and all the snails were counted.

In barley:

Every 10 metres for 100 metres, the number of snails in the barley windrow in a 0.1 metre square quadrat were counted. The snails were all collected and spray painted with bitumen paint. The snails were then placed back to where they were found and the windrow replaced. For every count in the windrow, the adjacent inter-row(2 metres from the windrow) was also counted. All the snails in a 0.1 metre square quadrat were counted, sprayed with bitumen paint and then placed back to where they were found.

After windrow burning, the same locations in the swath and inter-row were sampled and all snails removed to determine the number of live and dead snails.

Results

In canola:

In the canola windrow, pre-burning, there was an average of 250 live snails per square metre (Figure 1). After windrow burning, no live snails were found in the windrows.

In the inter-rows, the counts of snails pre-burning were not done. However, counts done in the inter-row post windrow burning found only live snails suggesting windrow burning does not cause mortality to snails that are in the inter-row. At least 10 snails per square metre were found in the inter-row, 25 times less than that found in the windrow. This suggests snails are more likely move into a canola windrow than stay in the inter-rows.

There was no feeding damage recorded in the following barley crop in 2016 indicating that windrow burning reduced the snail population down below a threshold expected to cause damage in barley.

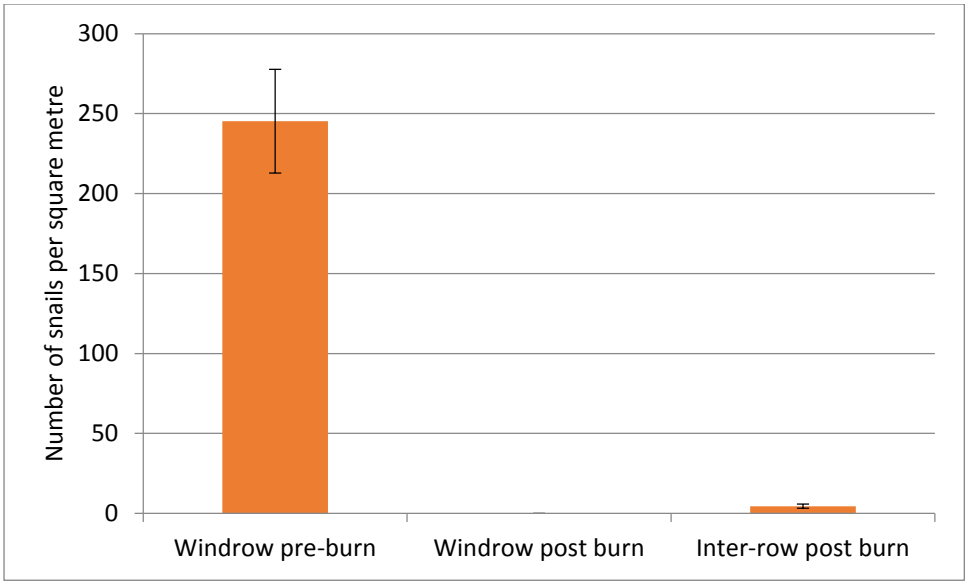

Figure 1: Number of small pointed snails in canola swaths and inter-rows ± standard error

In barley:

The entire paddock was burnt in the barley crop, not just the windrows as snails were found to be present in the inter-rows. There were significantly (P>0.05) more snails in the cereal windrow before burning (Figure 2). No live snails were found in windrows post burning.

There were significantly fewer snails in the inter-row post burning compared to pre burning, however there were still 50 snails per square metre that survived burning in the inter-rows. Higher numbers of snails were found to survive if they were associated with green weeds present in the paddock. The weeds were only found in the inter-rows and not in swaths.

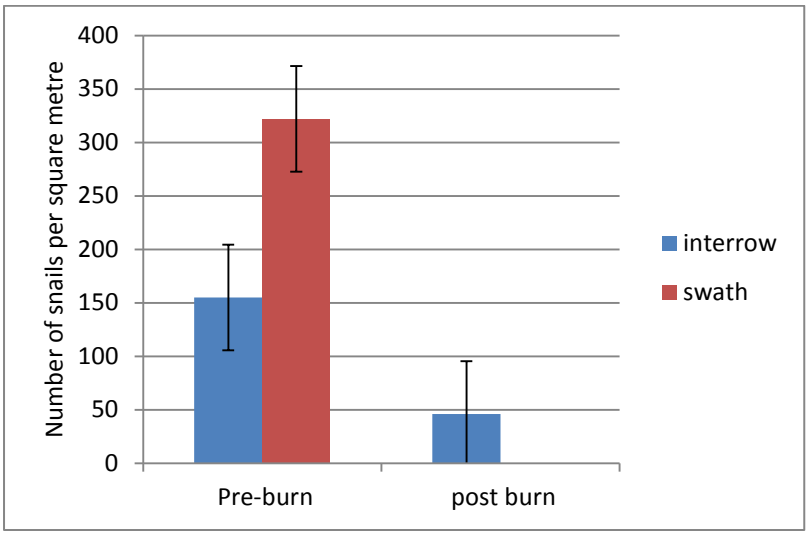

Figure 2: Number of small pointed snails in cereal windrows pre and post burning ± standard error

What does it mean?

Canola windrows had higher numbers of snails present than were found in inter-rows, suggesting the majority of the snails moved into the windrows after they were formed. Windrow burning caused 100% mortality for the snails present in the windrow but did not cause any mortality to snails present in the inter-rows where no burning occurred.

The barley windrow also had higher numbers of snails than the inter-rows suggesting the snails also moved into the windrows. However, only about two-thirds of the snails moved into the windrow leaving one-third in the inter-row. This means that burning the windrows only in this paddock would not have controlled snails.

Conclusion

Windrow burning can be used as a snail management tool but the amount of fallen stubble on the soil surface and the presence of weeds can aid snail survival.

In these 2 trials, burning reduced snail populations by over 90% which may reduce numbers to below threshold levels in some situations but not in others.

Key words

Stubble burning, snails, small pointed snails,

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