Innovative detection of small pointed snails.

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Key messages

Patches of small pointed snails can be detected at harvest using cameras and apps loaded onto mobile phones and attached to the wheel of the harvester.

From this information contour maps of the occurrence of snails in a paddock can be generated. This will allow the targeting of future control.

Aims

To determine the feasibility of detecting small pointed snails at harvest using mobile phones to monitor the grain as it is being harvested or photograph the ground by attaching it to the harvester wheel.

Method

A program was written to instruct a mobile phone to take photos when it was in a horizontal position and record the date, time and GPS coordinates. The phone was attached to a pin wheel and photographed grain as it was being harvested or was attached to the harvester wheel to take photos of the ground during harvest. As the wheel turns the phone takes a photo when it was pointing downwards and this is intended to eliminate motion blur and provide a high quality photo for detecting snails or other targets. These photos were manually processed to search for small pointed snails. Photos were also taken by hand mimicking the procedure of the wheel camera and manual estimation of the snail density was conducted on the same area. This data was then used to create a contour map of the snail density in the areas surveyed.

Results

Detection of snails on the ground.

Snail density estimated from photographs taken by the wheel camera, hand held mimics of the wheel camera and those estimated by direct observation were combined into a matrix. From this the contour map of snail density in the area was produced as shown in figure 1. This map could be used to target future snail control activities or assess the effectiveness of prior control. At this stage detection on the ground doesn't distinguish between live and dead snails whereas the detection in the grain only picks up live snails as they have to climb up to the heads in order to be harvested.

Detection of snails in grain.

Many of the photographs retrieved from the phone attached to the pinwheel in the grain flow were blurred because the phone camera focussed on the background rather than the grain leaving the auger. A better mechanism to present the grain to the camera or a different camera in which the focus may be fixed is required. A backup camera fixed to the side of the grain bin and using time lapse photography also provided very poor photos that were affected by motion blur. Because a good data set from the photos of snail densities in grain could not be produced, it was not possible to correlate them with the ground observations and determine the latency between the snails in the paddock and when they appear in the harvested grain.

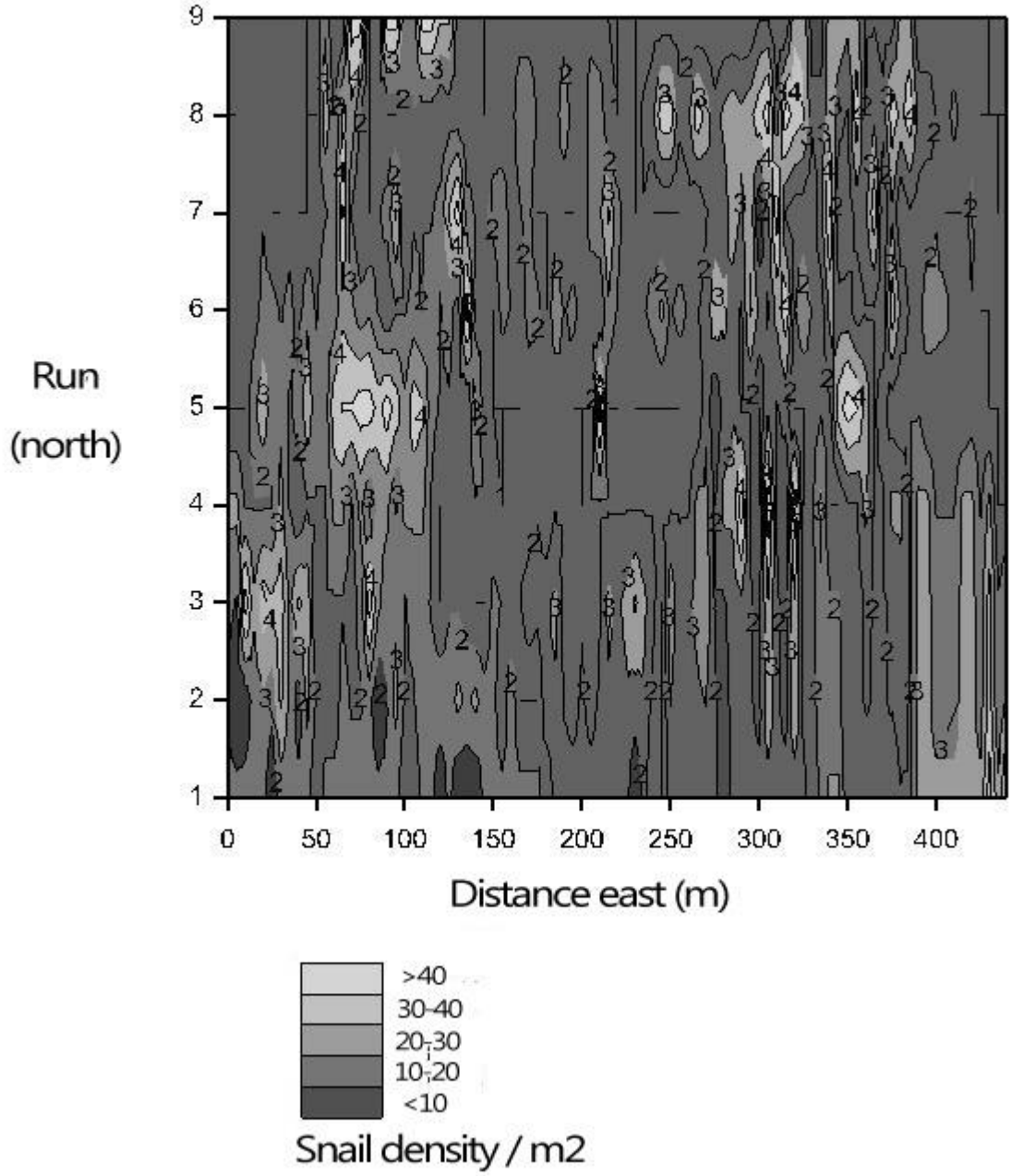

Figure 1: A map of the Small Pointed Snail densities in the survey area in December 2015.

Conclusion

In this study detection of snails on the ground was quite successful but required time consuming manual observation of the photos to generate the data for the contour maps. Because these photos are complex, automating the image analysis is going to be difficult. Image analysis of the grain is somewhat simper and has been done by the authors but more work is required on producing a suitable procedure for capturing the images of the grain as it is being harvested. This will be the conducted in proposed future research.

Key words

App, contour, density, grain, image analysis, mobile phone, monitoring, mapping, Prietocella barbara, Small Pointed Snails, snail

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