Control of slugs in White Clover and Wheat

Key Points
- Very significant cost benefits resulted from the use of all slug baits. In wheat no baits provided financial benefits. Larbait was the best bait for control of slugs in clover – cost benefit $2428/ha.
- In both wheat and white clover Larbait was effective in controlling juvenile slugs. Mesurol gave effective control of adult slugs in white clover and wheat. Overseas data suggests mixtures of slug baits can improve control.
- Slug traps which measure slug numbers in a confined area can be used to give a guide as to the need to apply baits. Based only on last years data in white clover applications should be made when over 25 slugs/sqm are present. In wheat economic responses are unlikely until populations exceed 60 slugs/sqm. More data is needed to confirm these thresholds.
- Establishing a firm, fine seedbed will help to control slugs. Stock trampling can also be used to reduce populations. These trials were done in paddocks where populations were expected to be high.

Background
Slugs are reported to significantly reduce the yield of wheat primarily due to reductions in the plant populations. Yield reductions of over 80% have been recorded in the US in wheat crops with slug densities of only 24/m². In the UK, damage to autumn wheat has been correlated with the numbers of slugs trapped.

In New Zealand there is no definitive data which relates crop damage to slug populations to help define economic thresholds. However, the practice of non-confined trapping is widely used by farmers to determine the general population trends for slugs.

This project aimed to test a range of different slug baits for the control of slugs in establishing white clover and wheat crops. Slug numbers were determined using a slug trap, comprised of a metal cylinder of defined size pushed into the ground to prevent slug migration and covered with moist sacks and covers. The number trapped could then be related to the treatment and to the crop damage. The efficacy of the slug bait and some information on the damage thresholds is available from the trial.

The baits differ in their formulation and attractiveness and, particularly, their rainfastness.

Dismissal and Larbait specify that they work better under moist conditions as both are grain based baits and the moisture softens the bait.
- Larbait is a pasta based bait and is more rain fast and more persistent under wet conditions.
- Mesurol contains a slug attractant, is more effective under drier conditions and should not be used if rain is likely after application.
- Slugout and Yates Blitzem both have a rain resistant formulation. Yates Blitzem specifies it works better in drier conditions.

There are reports that slugs exposed to metaldehyde baits that interfere with the mucus system and cause dehydration, can rehydrate if exposed to water soon after ingestion. However, recent data from the UK indicates this is not the case. This information also suggests there could be benefits from using mixtures of the dehydration and stomach poison type baits.

<table>
<thead>
<tr>
<th>Table 1: Modes of action of slug baits, recommended rates and active ingredients. *Approximate retail price</th>
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<tbody>
<tr>
<td><strong>Product</strong></td>
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<tr>
<td>Dismissal Slug &amp; Snail bait</td>
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<td>Larbait</td>
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<td>Mesurol Slug &amp; Snail</td>
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<td>Slug out</td>
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<td>Yates Blitzem Pellets</td>
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White clover:
The slug baits (as in Table 2) were applied to a white clover crop two days after it was direct drilled into a moist soil. The slug population at sowing was 117 slugs/m². The numbers of slugs were assessed 10 days after the application of pellets and during this time frame there was a significant rainfall, (50mm), 7 days after pelleting.

Larbait provided the best control of slugs – reducing the populations by 92% (Table 2). Mesurol gave 85% control. All baits gave very good control of the adult populations (Larbait was significantly better than Dismissal and Slug Out) and Larbait gave significantly better control of the juvenile slugs than the other baits. In white clover the adult to juvenile ratio was 0.68 to 1.

In the absence of any slug control very few white clover seedlings emerged. Establishment was higher in the Larbait plots than in the other treated plots and this was reflected in the visual score in November. The difference in establishment and vegetative development was also reflected in the yields and the cost benefits (margin over chemical cost), based on a white clover price of $4.00/kg and an application cost of $8.00/ha.

White clover establishment dropped rapidly as the slug population increased until around 50 slugs per sqm when very few plants established. Generally at slug densities less than 25/m² the establishment was satisfactory (Figure 1). There was also a decrease in seed yield as the slug population increased (p<0.001) (Figure 2) in this white clover crop two applications of slug baits may have been more effective.

Wheat:
The slug baits (as in Table 2) were applied to a June sown wheat crop two days after it crop was direct drilled into moist soil in a paddock which was previously in white clover. The slug population at sowing was 60 slugs/m². The numbers of slugs were assessed 1 month after the application of pellets. There was a significant rainfall, (28mm), 9 days after pellet application.

The repeat applications resulted in the best control of slugs but this did not result in yield responses over other treatments. Mesurol gave good slug control. The establishment figures show that establishment was not a good indicator of either slug control or crop yield (6.0 – 6.6 t/ha). Even when populations of slugs were markedly reduced there were no cost benefits (-$6 to -$651) from using baits. The difference in slug control, the lack of establishment and yield responses in wheat from that seen in white clover may reflect the increased ratio of adults to juveniles, 1.1 to 1.

In wheat at the low populations of slugs present in these crops the use of slug baits was not justified.

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