

## Scouting Protocol for Lettuce incorporating IPM

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*If we are to spend important time walking crops, shouldn't we make that time productive, with as much information as we can gather, to make informed decisions for crop management?*

### Key points for crop monitoring or what do I look at?

The whole lettuce plant needs to be examined for pests, particularly eggs of caterpillars with the most critical being *Helicoverpa* spp., and beneficial arthropods (eg, insects and spiders)

- Eggs can be found on the underside of leaf or in the centre of the plant, as well as on the top side of leaves.
- After hearting, inspect the wrapper leaves and underneath the oldest leaves closest to the soil.
- It is important to check all laying sites for eggs. Moths can lay eggs underneath the leaves close to the ground and once the newly-hatched larvae (neonates) emerges from the eggs, larvae can burrow into the heart of the lettuce and will not be seen.
- At hearting it is advisable to conduct a few destructive samples (at least 10 heads), especially if you suspect that grubs may be in the heart, eg: outside wrapper leaves have feeding damage. Older leaves can look ragged and torn and feeding damage may not be clear. If in doubt cut open some heads to check.
- Tagging a plant and marking the location of eggs can give you an idea on the time of hatching. This also gives some idea as to how quickly the generation time is at that point in time, e.g., from white egg to neonate, 2 to 10 days dependent on temperature. You can continue to monitor the same plant for change in activity. But remember eggs can be eaten or washed off.
- Younger crops are easier to scout and can provide an indication of activity. Crops from 3 weeks to pre-hearting. If pests are present in young crops, hearting crops should be destructively sampled to check.
- If there is little pest pressure in young crops hearting crops should be destructively sampled but fewer plants need to be checked.

**Note:** Rain events, irrigation and predators can remove eggs.

### Equipment Needed:

- Hand lens or magnified visor (X10 power)
- Paint brush (for collection of small insects or eggs)
- Specimen vials (for collection of unidentified insects)
- Sample bags (for specimens of disease, or weeds)
- Crop monitoring sheet, clipboard & pen
- Pests, disease, weed I.D guides
- Sticky traps for monitoring flying insects, pests & beneficials



### Key Pests

*Helicoverpa* spp., (corn earworm and native budworm), looper caterpillar, cutworm, aphid thrips and leafhopper (see Field Identification Guide – Pests, Beneficials, Diseases and Disorders in Lettuce)

### How do I know there are beneficials around?

#### Predators and Parasitoids:

- *Helicoverpa* eggs that are black/silvery have been parasitised by parasitic wasps such as *Trichogramma* or *Telenomus* (these wasps are very small, with some species smaller than 1mm and are very hard to detect in the crop).
- Bronze coloured shells of aphids, often called mummies, have been parasitised by the wasp *Aphidius* spp.
- Hoverfly larvae (syrphid) are effective predators of aphids and will increase in numbers with growing population of aphids.
- Most beneficial arthropods will be obvious in the crop, but for winged beneficial and pest species, yellow sticky traps can be used to detect their presence.

It is important to monitor for beneficial arthropods. If these are in high numbers a chemical application may not be warranted or else a softer biological application may be more effective.

**Beneficial Arthropods include:**

<b>Beneficial</b>	<b>Target Pest</b>
Predatory wasps, spiders, green and brown lacewings, soldier bugs, damsel bugs, assassin bugs, lady beetles, big eyed bugs, pirate bugs	These are general predators feeding on aphids, thrips, moth eggs, caterpillars and other insects.
Hover Fly Larvae, Wasp Parasitoids	aphids
Parasitoid Wasps, Shield Bugs, Tachnid Flies, Earwigs	caterpillars

It is important to remember that pest populations will increase rapidly while beneficial arthropods will take longer to build up to numbers that may control pests.

The decision to spray will depend on crop stage, pest pressure, beneficial numbers and changes over time. For example once aphids have been seen it is important to monitor the crop to assess the increase in activity of beneficial arthropods and the changes in aphid population. There will be a delay while beneficial numbers increase.

**Intensity and frequency of crop monitoring**

- The number of plants you should inspect will depend on the area of lettuce you plan to monitor. If the plantings of lettuce are close together in growth stage, they can be grouped as one planting e.g. group plants 2, 3 & 4 weeks old, 5 & 6 weeks old.
- No less than 20 plants should be checked and 50 are better if time permits, as it increases the accuracy of the estimate of pest and beneficial numbers.
- If checking 30 plants, you could select 3 plants at 10 random sites throughout the planting. It is advisable to check more thoroughly up to hearting, to reduce the incidence of grubs in centres.
- If, on inspection, the crop has 2 grubs in 30 plants and high beneficial activity, it would be worth re-checking the crop in a few days, depending on the weather.
- Generally speaking, when pest pressure is low to moderate, the monitoring period should be once a week. In periods of higher pest pressure, twice a week may be necessary; this is also a good check on the effectiveness of any control treatments.
- This more frequent monitoring can also give a better picture as to the rate of the generation time, e.g. from white egg to neonate, 2 – 10 days dependent on temperature, light and humidity.
- Also, after heavy rain or irrigation, grubs can be washed off or damaged, so it may not be necessary to spray after such an event.

## Moth Monitoring

For *Helicoverpa* spp, Scentry® pheromone traps should be used (with separate traps for native budworm and corn earworm, placed at least 50m apart).

If moth numbers are low, scout weekly.

If moth numbers are high, scout twice weekly or after large flights.

*H. punctigera* (native budworm) will be active in spring while *H. armigera* will tend to be most active early summer and late summer/autumn.

## Crop monitoring patterns

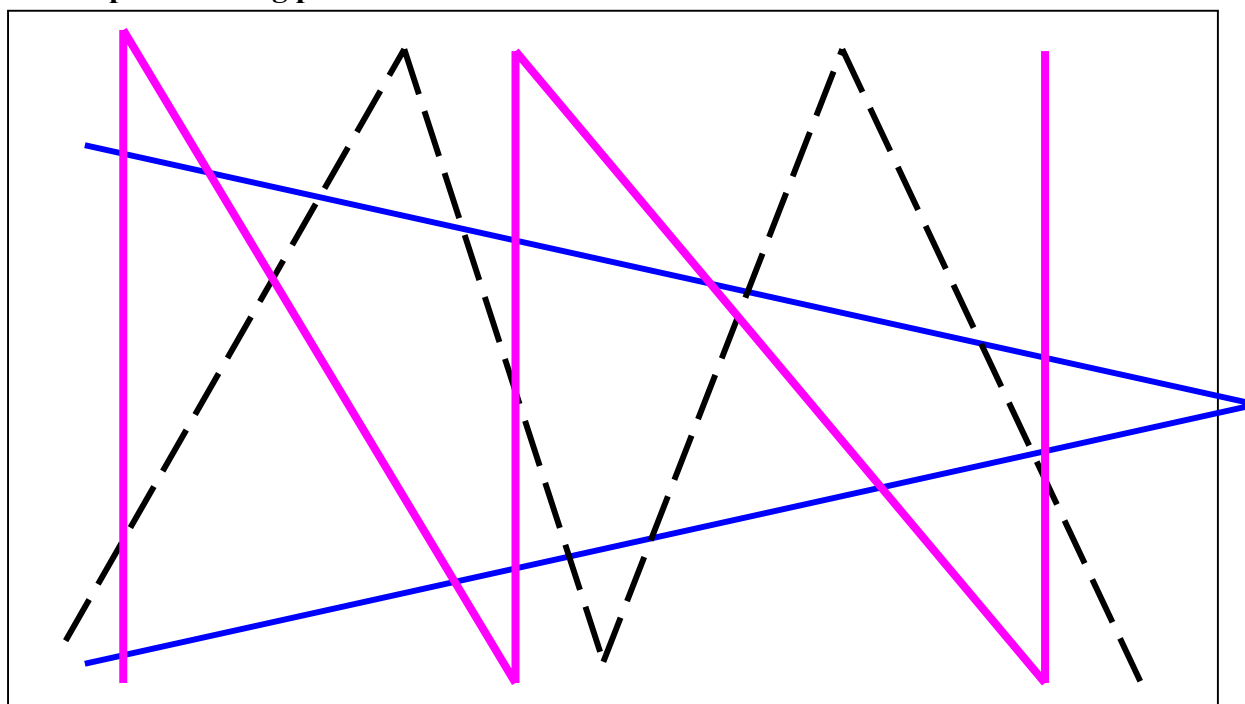


Fig 2. Patterns used for crop monitoring W, V or Zigzag. Use a type of pattern that takes in a broad cross section of the planting and do not concentrate on any hot spots or edges, otherwise this will skew the final result.

Scentry® pheromone trap



### Disclaimer:

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Sample record sheet

Grower		Block			Stage			Weather					Date		Disease/Virus present							
Plant	Helicoverpa Eggs			Helicoverpa Larvae			Other Pests					Beneficials										
Number	White	Yellow	Brown	Small	Medium	Large	Pests	PH	RB	T	AH	Black egg	LB	S	W	LW	RB	SB	DB	AB		
1																						
2																						
3																						
4																						
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PESTS PH= Plant Hopper RB= Rutherglen Bug T= Thrip AH= Aphid  
 BENEFICIALS Black egg = parasitised egg LB= Lady beetle S= Spider W= Wasp LW= Lace wing RB= Rove beetle SB=Shield bug DB= Damsel Bug AB= Assassin  
 NOTE: Crop monitoring sheet will change depending in insects that are active.

- Eg Take out Damsel bug when Hover flies are in abundance etc. This crop monitoring sheet is designed as a template to be modified during the season.