

Integrated Pest Management in Mungbeans and Soybeans

Decision Making
for Insect Management
in Grain Crops



Overall pulse pest management aims



- 1. Protect yield/quality in an economically rational manner – use thresholds**
- 2. Avoid pesticide resistance - observe pesticide resistance guidelines**
- 3. Foster farming systems that suppress pests, not generate pests – beneficials, cultural, host resistance, thresholds**

Mungbeans, a brief description



- Short-season, indeterminate tropical pulse
- Seed quality **critical** to achieve to top \$\$
- IPM IS CHALLENGING BUT -----
- NOT IMPOSSIBLE

Soybeans, a brief description



- **A longer season summer pulse/oilseed**
 - **Determinate cultivars in northern Australia**
 - **Indeterminate cultivars in southern Australia**
- **More tolerant of pests than other pulses**
- **Seed quality critical for edible market**
- **IPM driven by SLW/mites**

Mungs in particular a fast crop so beat sheet regularly!



Monitor pests, beneficials & crop stage

Key mungbean/soybean pests



Helicoverpa armigera

Attack leaves, **buds**, flowers & pods



Podsucking bugs

Suck pods reducing seed quality



bean podborer

Attack buds, flowers, pods
Major tropical mungbean pest



SLW

Threaten **soybeans** but not mungbeans. Flared by hard pesticides



mirids

Attack buds, flowers
Major mungbean pest but not in soybeans

Bean podborer



Mainly a problem on coast but reports as far as west Surat in the wet years of 2012/13

Lesser pests



Mainly leaf feeders but
can attack flowers



Mungbeans only.
Infest stems & pods



Soybeans only. Above
threshold ppns. delay
harvest maturity



Seedlings & flowers



Under leaves – flared
by hard pesticides



Soybeans only. Common at
low densities but
spasmodically occurs in
huge numbers

Integrated Pest Management?

What cards do we have?



- Paddock selection to avoid/minimize pests
- Best practice agronomy – increases pest tolerance
- Conserve natural enemies – free control - by using ‘more-selective’ ‘softer’ pesticides
- Only spray above-threshold pest populations saves \$\$ and conserves natural enemies

Key IPM messages

“Go Soft Early”



“Beneficials save you money!”

IPM best bets/opportunities

Vegetative mungbeans & soybeans - loopers



- Tolerance of early damage opens door for biopesticides
- Up to 33% looper defoliation no yield loss
- Bt (Dipel) effective against loopers

Grass blue butterfly slug like larva



Lop terminals & buds

Bt a soft option





Why might NPV (Vivus, Gemstar) be the preferred heli option in vegetative crops?

1. Resistance management
2. Conserve beneficials
3. Conserve 'big guns' for flowering/podding stages
4. Don't need to kill every heli in vegetative stage
5. No yield loss if up to 7/m² soys & 4-5/m² mungbeans



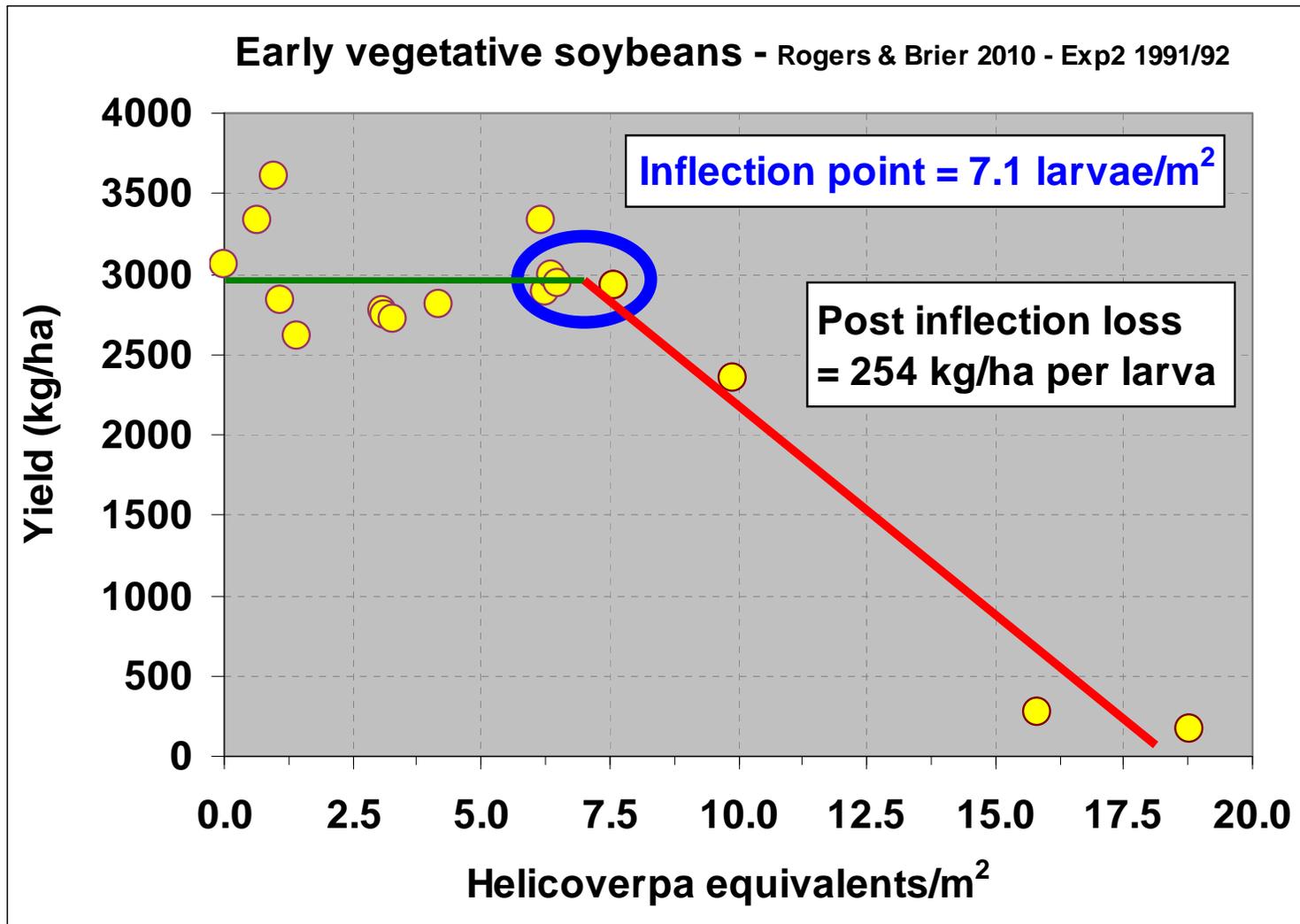
Heli NPV in vegetative soybeans and mungbeans

- **Timely detection**
- **‘Optimal’ adjuvant, timing & good coverage**



Vegetative soybeans – Helicoverpa

IPM target - Keep larvae $<7/m^2$



‘NEW’ pest on Downs & NW NSW in vegetative soybeans



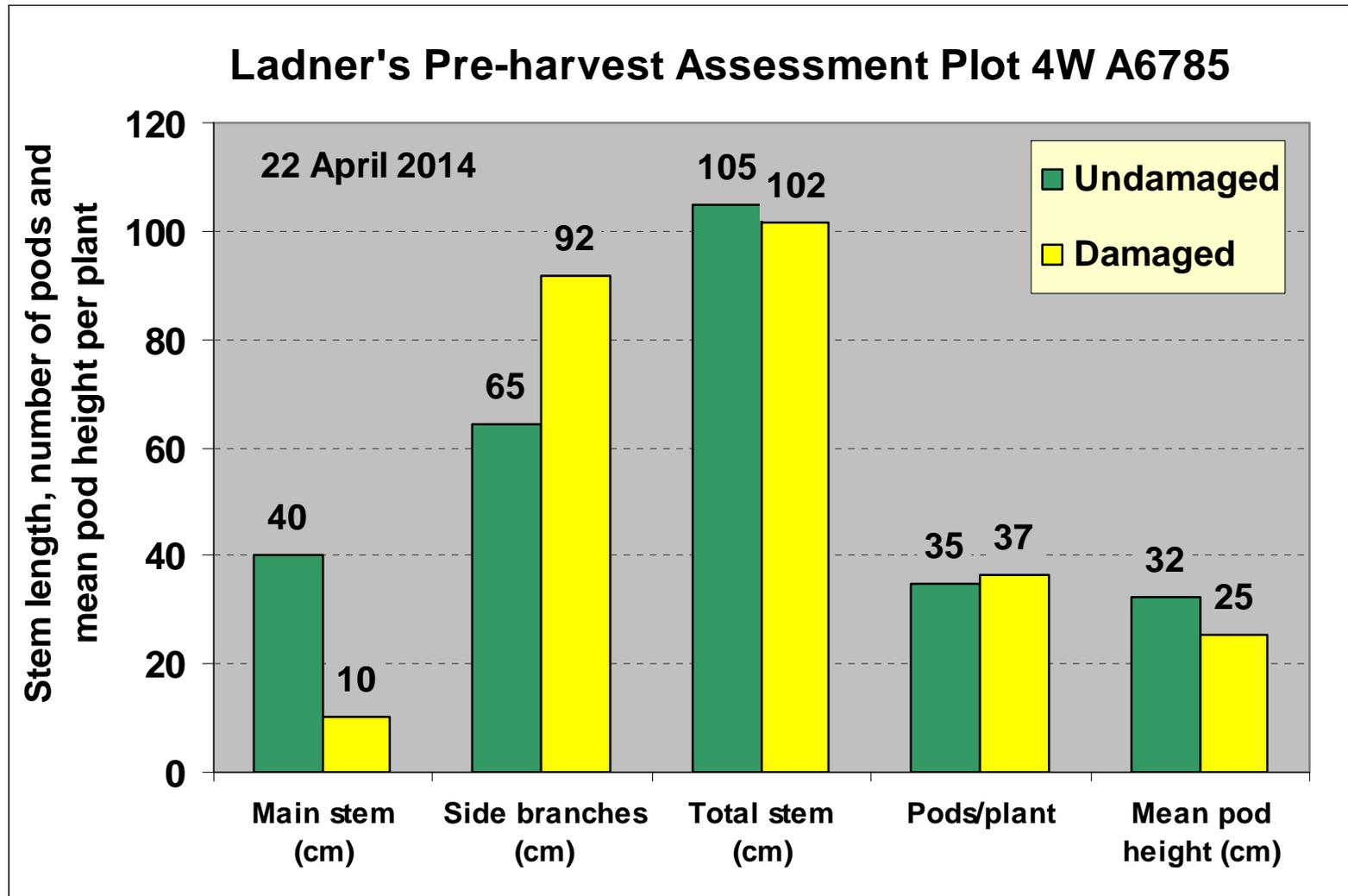
Etiella damage in vegetative soybeans?



**Watch for
unusual
symptoms**



Damage to main stem compensated for by increased side branches. Same no. pods/plant but set lower down.



Need to confirm in further trials

Etiella in budding mungbeans Downs Jan 2014



**Please report any suspicious
webbing of buds/flowers**

IPM best bets/opportunities Mirids in mungbeans at budding/flowering/podset



- **Optimize spray timing & consider lower dimethoate rates with salt adjuvant**

Scenario 1:

Mirids are at threshold & helis are below threshold in early flowering mungbeans



- No net gain if spray as mirids are at ‘break even’
- Full dimethoate rate can flare helicoverpa
- Re-assess in 4 days time
- If mirids increase markedly, consider low rate dimethoate + salt adjuvant (0.5%)

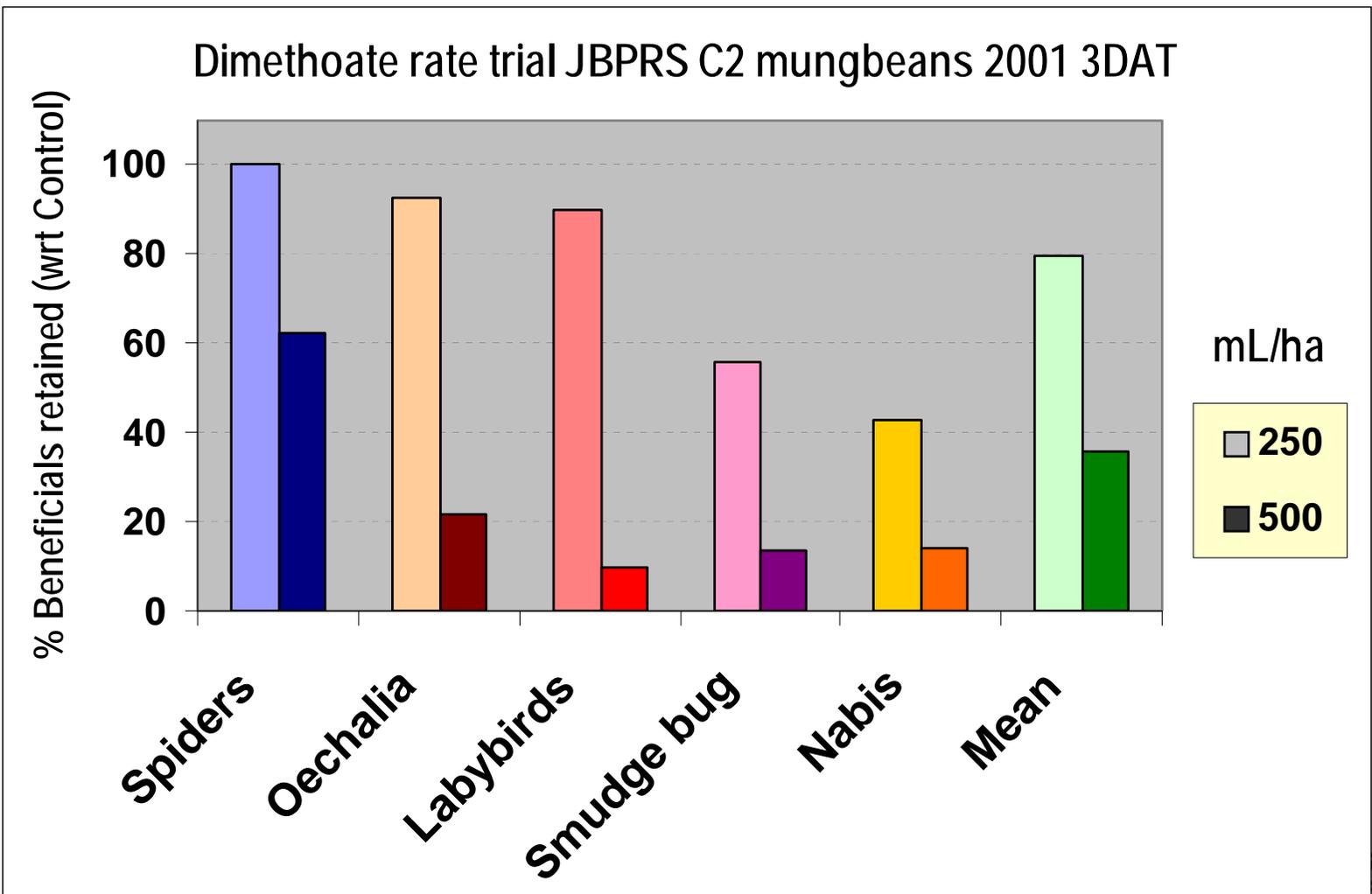


Further information to consider for Scenario 1



Scenario 1 background information

Low rate dimethoate (250mL/ha) has far less impact on most beneficials



Economic Threshold Table for Mirids in Flowering Mungbeans

Decision Making
for Insect Management
in Grain Crops



Control Cost \$/ha	Threshold (adults + nymphs/m ²) at crop values below					
	\$ 400	\$ 500	\$ 600	\$ 700	\$ 800	\$ 900
\$ 10	0.4	0.3	0.3	0.2	0.2	0.2
\$ 15	0.6	0.5	0.4	0.4	0.3	0.3
\$ 20	0.8	0.7	0.6	0.5	0.4	0.4
\$ 25	1.0	0.8	0.7	0.6	0.5	0.5
\$ 30	1.3	1.0	0.8	0.7	0.6	0.6
\$ 35	1.5	1.2	1.0	0.8	0.7	0.6
\$ 40	1.7	1.3	1.1	1.0	0.8	0.7

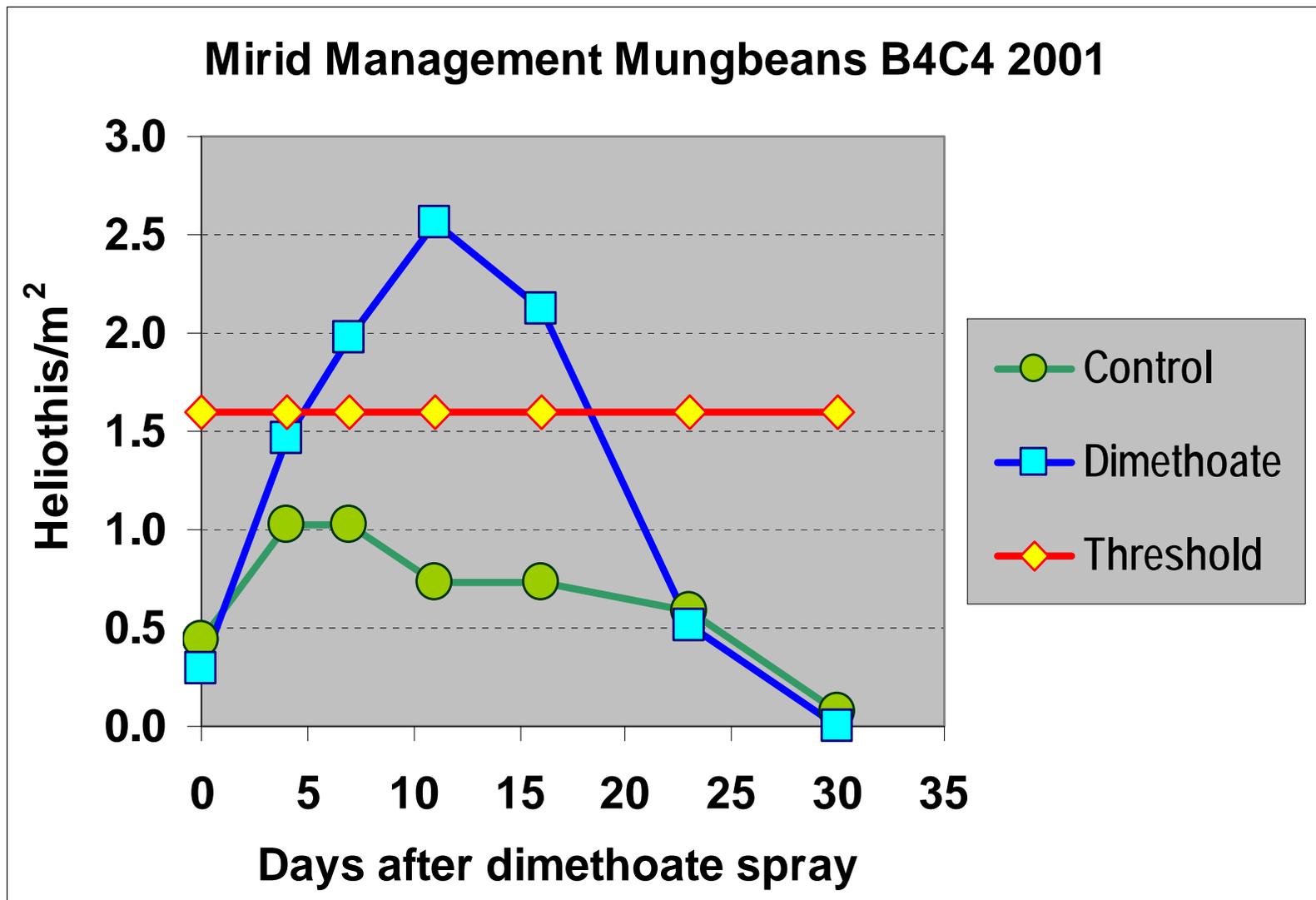
- Cross-reference Control Cost vs Crop Value
- For Cost of Control = \$15/ha & Crop Value = \$700/t, ET =0.4
- Threshold based on mirid damage in crop for up to 4 weeks

Just remember



- **Mirid thresholds are low because dimethoate is cheap**
- **Mirid thresholds are based on sustained attack over 28 days – i.e. in this scenario: 0.4 mirids over 28 days**

Dimethoate @ 500mL/ha can increase the risk of subsequent helicoverpa attack



Mirids in mungbeans

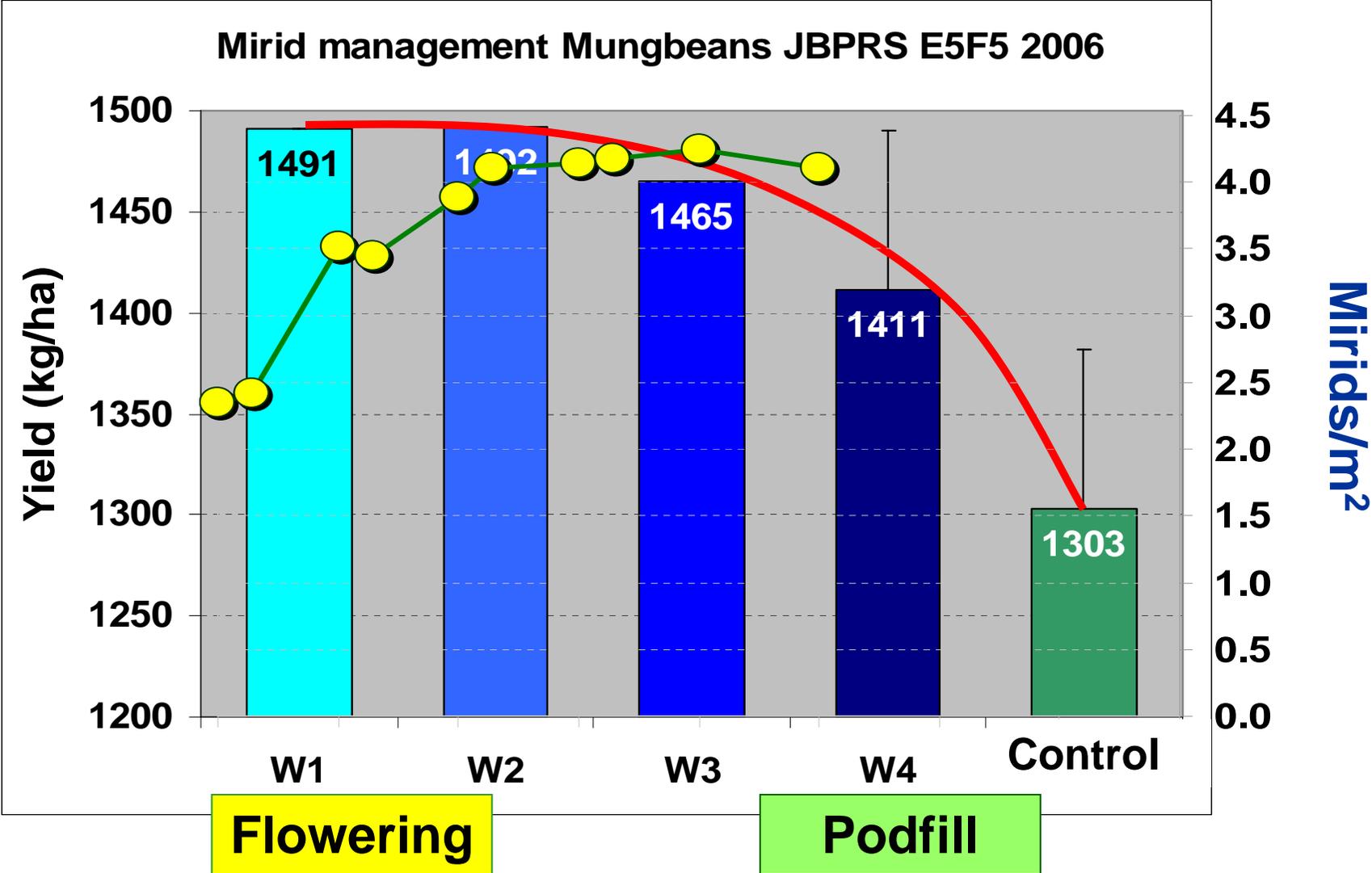
- Budding/flowering/podset



- **Delaying a mirid spray !!***##**
- **This is heresy!**
- **Show us the data!**

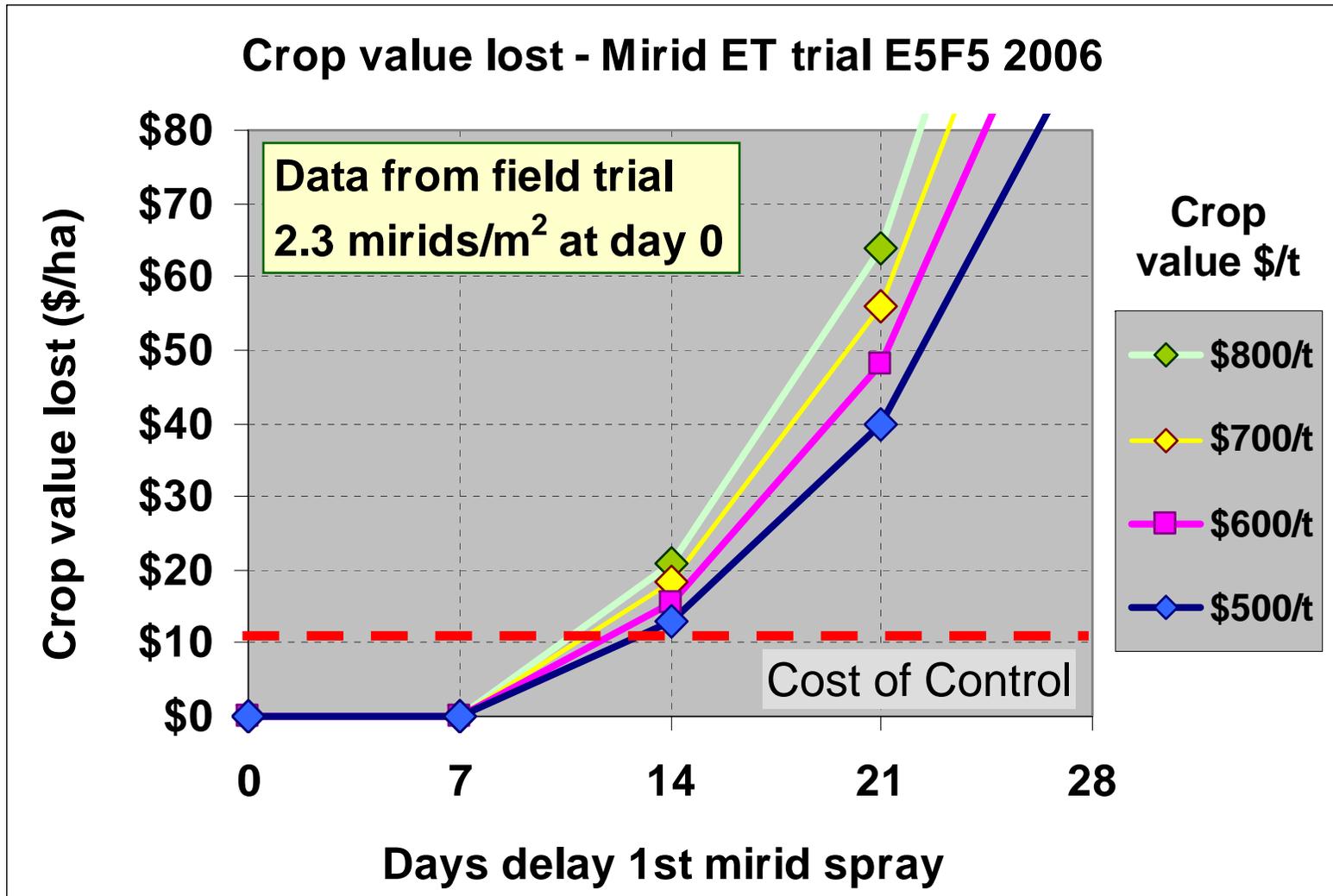
Mungbean yields where 1st mirid spray applied progressively later at weekly intervals from flowering (W1) onwards.

No yield loss despite starting population of 2.3 mirids/m²



Mungbeans

Can delay 1st mirid spray slightly by up to 7 days with no \$\$ loss – if mirid ppn. not too high



IPM best bets/opportunities

Budding/flowering/podset



Mirids in soybeans?

- Far more tolerant than mungbeans
- Usually no need to spray as ET is 5/m²

IPM best bets/opportunities

Podfill/Pod ripening

Helicoverpa



- Indoxacarb preferred option
- Lower impact (softer) on parasitoids & bug predators than carbamates
- SP's ineffective against *H armigera*
- Observe thresholds – see following tables

Economic Threshold Table for Helicoverpa in Podding Mungbeans

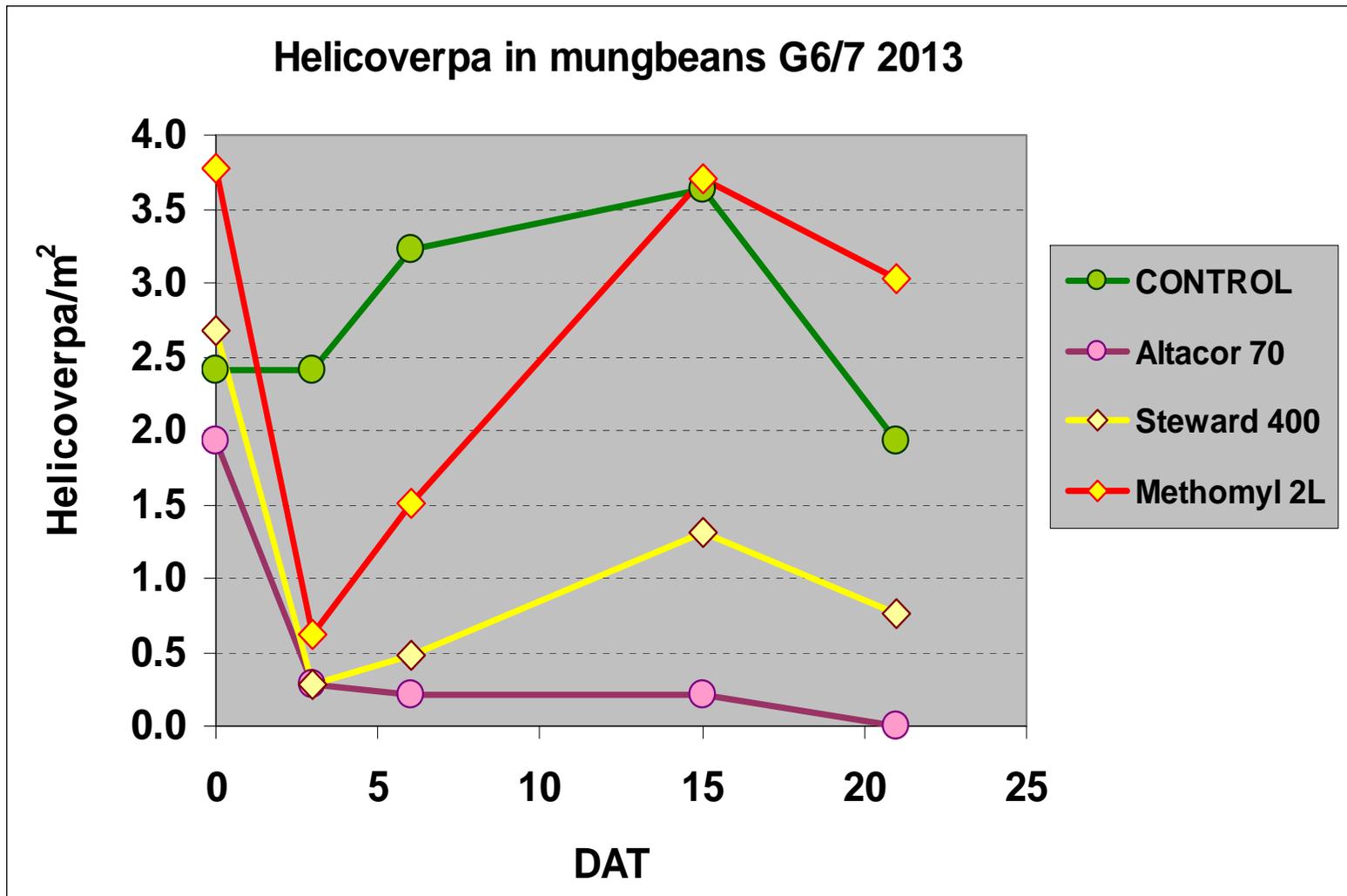


Control Cost \$/ha	Threshold (larvae/m ²) at crop values listed below (\$/t)						
	\$ 400	\$ 500	\$ 600	\$ 700	\$ 800	\$ 900	\$ 1,000
\$ 15	1.1	0.9	0.7	0.6	0.5	0.5	0.4
\$ 20	1.4	1.1	1.0	0.8	0.7	0.6	0.6
\$ 25	1.8	1.4	1.2	1.0	0.9	0.8	0.7
\$ 30	2.1	1.7	1.4	1.2	1.1	1.0	0.9
\$ 35	2.5	2.0	1.7	1.4	1.3	1.1	1.0
\$ 40	2.9	2.3	1.9	1.6	1.4	1.3	1.1
\$ 45	3.2	2.6	2.1	1.8	1.6	1.4	1.3
\$ 50	3.6	2.9	2.4	2.0	1.8	1.6	1.4

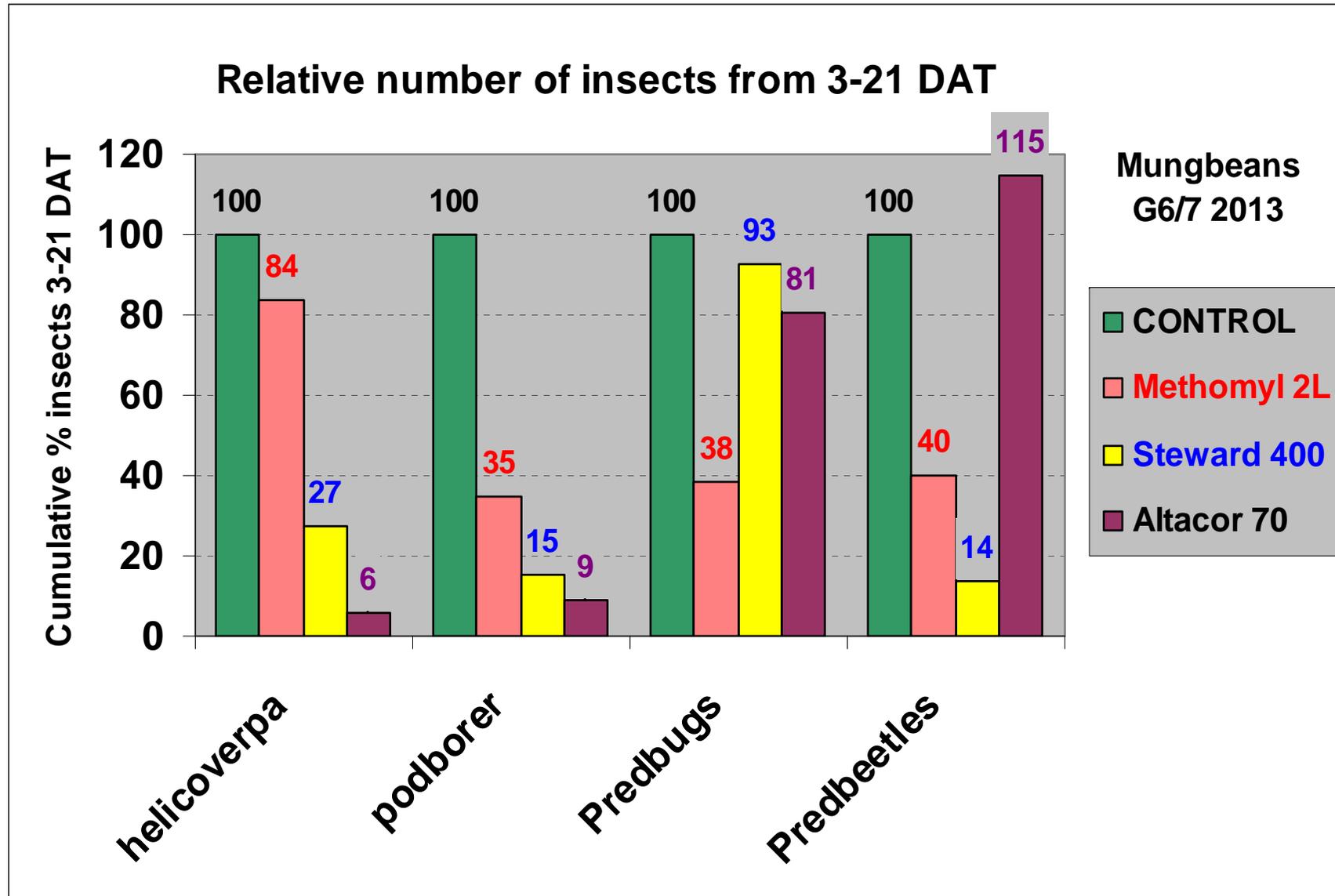
- Cross-reference cost of control vs crop value
- For Cost of Control = \$40/ha & Crop Value = \$700/t, ET = 1.6

New registration for caterpillars in pulses

- Altacor[®] is now the best of registered products
- Within 2 weeks, **methomyl** back at pre-spray levels



Altacor harder on caterpillars, softer on beneficials



Etiella in pod-filling soybeans?

- Early detection – based on moths?
- Early damage hard to pick
- **Thresholds high – 40/m² for aerial Altacor**
- Based on 1 seed/larva (0.2g)
- Threshold academic as larvae very difficult to control once inside pods



Podfill/Pod ripening Podsucking bugs



- No effective soft options
- Deltamethrin ® (SP) - GVB
- Shield permit 12699 - GVB & redbanded (LAPSED)
- Delay 1st spray till early podfill
- By then – lower risk of SLW or mites
- Need salt adjuvant for redbanded (Piezodorus)





Economic thresholds for pod-sucking bugs in **mungbeans (and soybeans) are higher in high yielding crops.**

Potential yield (t/ha)	0.25	0.5	1.0	1.5	2.0	2.5	3.0	3.5
GVBAEQ /m ²	0.1	0.2	0.3	0.5	0.7	0.9	1.1	1.4

Because thresholds are based on % seed damage & there are more seeds in higher yielding crops.

Mungbean thresholds based on GVBAEQ to give 2% seed damage

Economic thresholds for podsucking bugs in mungbeans and soybeans – Now in on-line threshold calculator



Simply google “Beat Sheet Blog”



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And select **‘Economic Threshold Calculators’**

Unsure as to how good IPM is for your pest/crop??

- **Leave unsprayed strip/s** and monitor pests prior to and post spray till harvest
- **Assess** yield, time to harvest, and evenness of maturity





IPM Summary Mungs & Soys

- **Sample regularly to detect the early stages of pest infestations and critical crop stages**
- **'Go soft early' wherever possible**
- **Conserve beneficials by:-**
- **Only spraying above threshold pest ppns.**
- **And using selective pesticides where possible**
- **Delay hard pesticides as long as possible**

