

# Sound IPM strategies for DBM control in brassica vegetable crops.

## Beneficials

- Focus on preserving naturally occurring and commercially released beneficial insects in the crop eg. supply nectar sources and harbouring sites for wasps.
- Use insecticides that have minimal impact on key beneficial insects such as *Diadegma semiclausum*, *Micromus tasmaniae* (brown lacewing) and predatory bugs. *Bt* sprays are the ultimate here for safety to beneficials however the horticultural industry will soon be releasing scientific data indicating the short and long term impacts of currently registered insecticides on a range of beneficial insects. Stay tuned.

## Cultural

- Control and destroy volunteer brassica weeds, harvested crop areas and abandoned brassica vegetable and brassica leafy vegetable crops in a timely manner so as not to breed up DBM populations.
- Transplant DBM free seedlings from commercial nurseries.
- Regularly (at least weekly) monitor the crop and document pest incidence and developmental stages.
- Be mindful of the rate of development of DBM based on prevailing weather conditions. Warmer growing conditions means faster developing insects, so shorter spray intervals may be required for all products. This is particularly the case for *Bt* sprays.

## Chemical (last resort)

- Only apply an insecticide if economic spray thresholds are reached. Target insecticides to the earlier instar stages as they are more susceptible particularly if tolerance levels to insecticides are increasing. Always document effectiveness of each insecticide application and never re-spray a failure with the same mode of action insecticide. Inform your local reseller or agronomist of any spray failures and try and understand why it has happened.
- Ensure spraying equipment is properly calibrated and in good working order so as to achieve good spray coverage. Refer to product labels for required spray quality (droplet size) and water volumes for particular crop stages. There is a lot of industry knowledge available regarding application technology and environmental conditions required at the time of application to optimise insecticide performance.
- Within the nominated IRMS windows, use a single Mode of Action insecticide in a “block” eg. could be two or three sequential applications, so as to coincide with a single pest generation and then rotate to a different Mode of Action insecticide.
- DO NOT apply any Mode of Action group to more than 50% of the life of the crop.
- Abide by the legal maximum allowable number of applications of a particular insecticide per crop per season. These restrictions are in place for sound insecticide resistance management and MRL compliance reasons.
- Use registered insecticides at the recommended label rates and adjuvants. DO NOT reduce label rates.
- DO NOT use mixtures of insecticides for controlling DBM.
- Avoid broad spectrum insecticides eg. OP’s, carbamates and synthetic pyrethroids or only use strategically. There are known high levels of DBM resistance to these products and they are also highly disruptive to beneficial insects.

*Plutella xylostella* control in brassica vegetable and brassica leafy vegetable crops BEST MANAGEMENT PRACTICE.

Within constraints of each window based on current DBM IRMS-

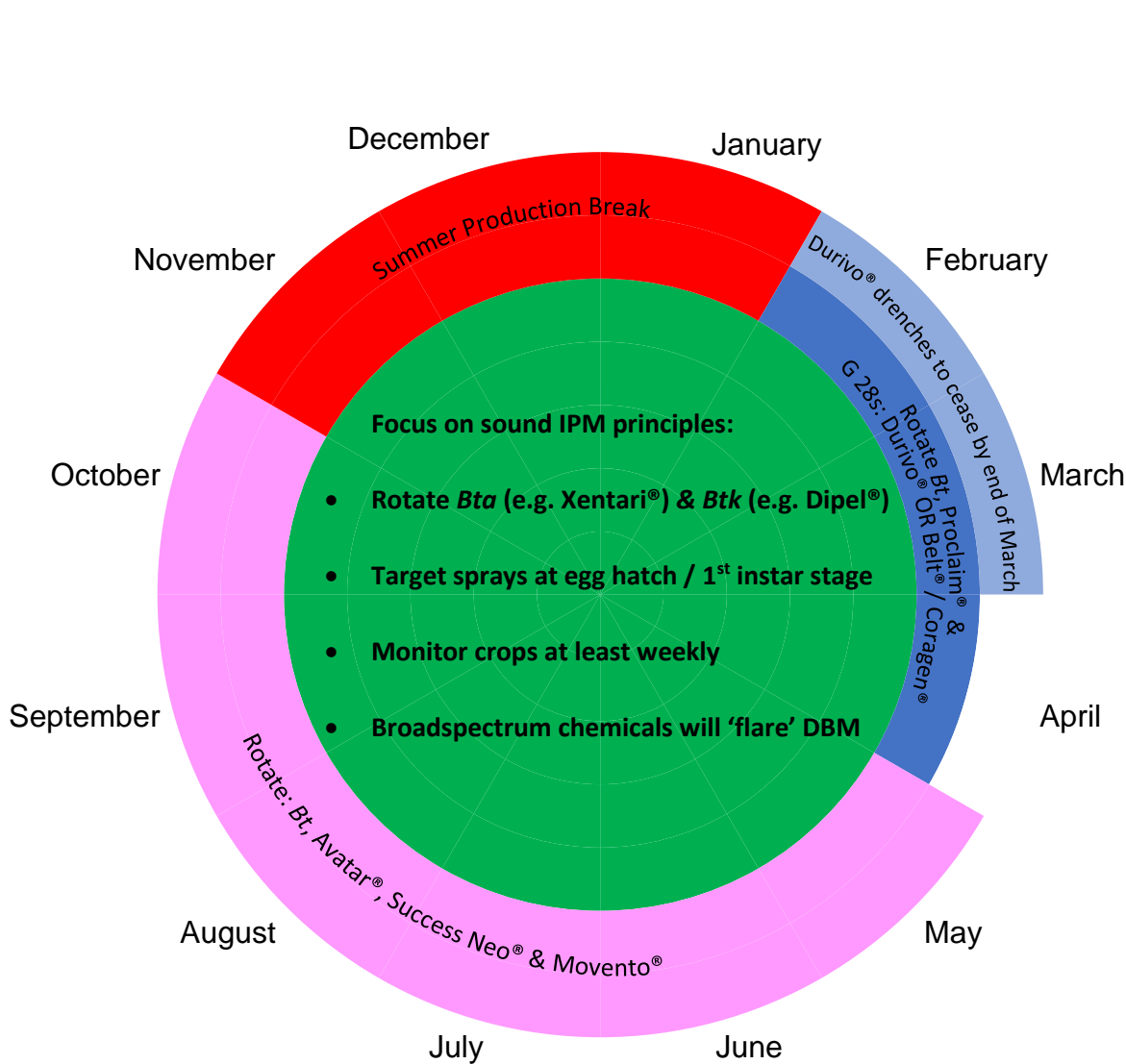
Crop growth stage	Seedling	Early vegetative	Mid vegetative	Protection of saleable commodity
Step 1	Rotate <i>Bt</i> 's <i>kurstaki</i> (eg. Dipel®) and <i>aizawai</i> (Xentari®) in conjunction with weekly crop monitoring and focus on sound IPM principles.			
If this approach is not effectively managing the DBM population then consider Step 2 intervention-				
Step 2	Success® Neo Proclaim® Avatar® Movento® Durivo®			Belt®, Coragen® - to reduce selection pressure on Group 28, it is recommended to use one (1) application per crop per season If Durivo® is used in crop at transplant, then foliar Group 28 is not to be used in that same crop
Step 3	If DBM population becomes too mixed in size, then knockdown population using a strategic application of Regent® and then resume using more selective options as in Step 2.			

	MOA group	Number registered applications allowable per crop per season		DBM life cycle-
		Brassica vegetables	Brassica leafy vegetables	
Organophosphates	1B	Recommend 2 only	Recommend 2 only	Female adult lays ~ 100 eggs.
Regent®	2B	4	Not registered for use	Larva hatch from egg and develop through four instar stages; first two instar stages have black head capsules.
Synthetic pyrethroids	3A	Recommend 2 only	Recommend 2 only	First instar larva tunnels into leaf tissue.
Success® Neo	5	4	4	Second-fourth instar larva feed openly on the plant surface (upper & lower).
Proclaim®	6	4	Not registered for use	Larva often "parachute" off plant with a silken thread.
Dipel® ( <i>Bt kurstaki</i> )	11A	No restrictions	No restrictions	Larva pupate in a silken pupa on leaf surface.
Xentari® ( <i>Bt aizawai</i> )	11A	No restrictions	No restrictions	Adult moth emerges from silken pupa.
Avatar®	22A	4	3	Life cycle development is temperature dependent-
Movento®	23	3	2	at 15°C it takes ~ 47 days
Belt®, Coragen®	28	3 - Recommend 1 only	3 - Recommend 1 only	at 25°C it takes ~ 17 days
Durivo®	28	1	1	

For all insecticides applied for DBM control, target egg hatch and first instar stages.  
Risk of product failure increases when targeting later instar (3rd and 4th) stages.



# "2-Window" Insecticide Rotation Strategy for Diamondback Moth in Brassica Vegetable and Brassica Leafy Vegetable Crops for the Lockyer Valley



**Summer Production Break**

A summer production break is recommended from November through to January to reduce the Diamondback moth population and minimise exposure to available chemicals

**Use of Bts as the primary control strategy**

Rotate *Bacillus thuringiensis* (Bt) strains aizawai (e.g. Xentari®) & kurstaki (e.g. Dipel®) as the primary form of chemical control

**First Window Insecticide Rotation - February to April**

*Bt* (G. 11 strains *Bta* & *Btk*). Bts form the primary control strategy Proclaim® (G. 6)

Durivo®\* OR Belt® Coragen®\*\* (G. 28)

\*Durivo® drenches to cease by end of March

\*\* If Durivo® drenches are used then no foliar G28s to be used in that crop

**Second Window Insecticide Rotation - May to October**

*Bt* (G. 11 strains *Bta* & *Btk*). Bts form the primary control strategy

Avatar® (G. 22a)

Success Neo® (G. 5)

Movento® (G.23) (1<sup>st</sup> instar larvae only)

Caution: Regent® (G. 2b) may be used in warmer periods for crop 'clean up' however this chemical should be used with caution due to its disruptive nature - broadspectrum chemicals 'flare' DBM.

The detailed information within this document has the support of the Lockyer Valley Growers Inc. committee, industry specialists and CropLife Australia