Vegetable Application Workshop

Introduction

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What are the 4 key limiting success factors

- Factors determining biological success of an application of crop protection products

- **Requires knowledge about the target**

- **Requires good observation of the crop, the pest and the weather**

Correct Product

Recommended Dose

Optimum Timing

Coverage Required

- **Check the product label**
- **Correctly Calibrated Equipment = No under or over-dosing**
- **Is the rate correct for the weed size?**

- **Use optimum spraying parameters:**
  - **spray volume**
  - **nozzle**
  - **pressure and droplet size**

Application Timing

Your Planned Spray Program

	Expected Length of protection													
Spray Program,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Planned (Actual) spray interval														
Under inclement weather or high irrigation frequency with a protectant					Protectant fungicide is washed off, growth dilution etc									

What happens in reality

	Expected Length of protection															
Spray Program,	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Planned (Actual) spray interval											windy		Pump blow a seal		Kids Sports Day	

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Fungicide Definitions

Preventative Fungicide

- **Applied before the development of the disease**
- prevents the germination of the spore or penetration of the pathogen into the plant

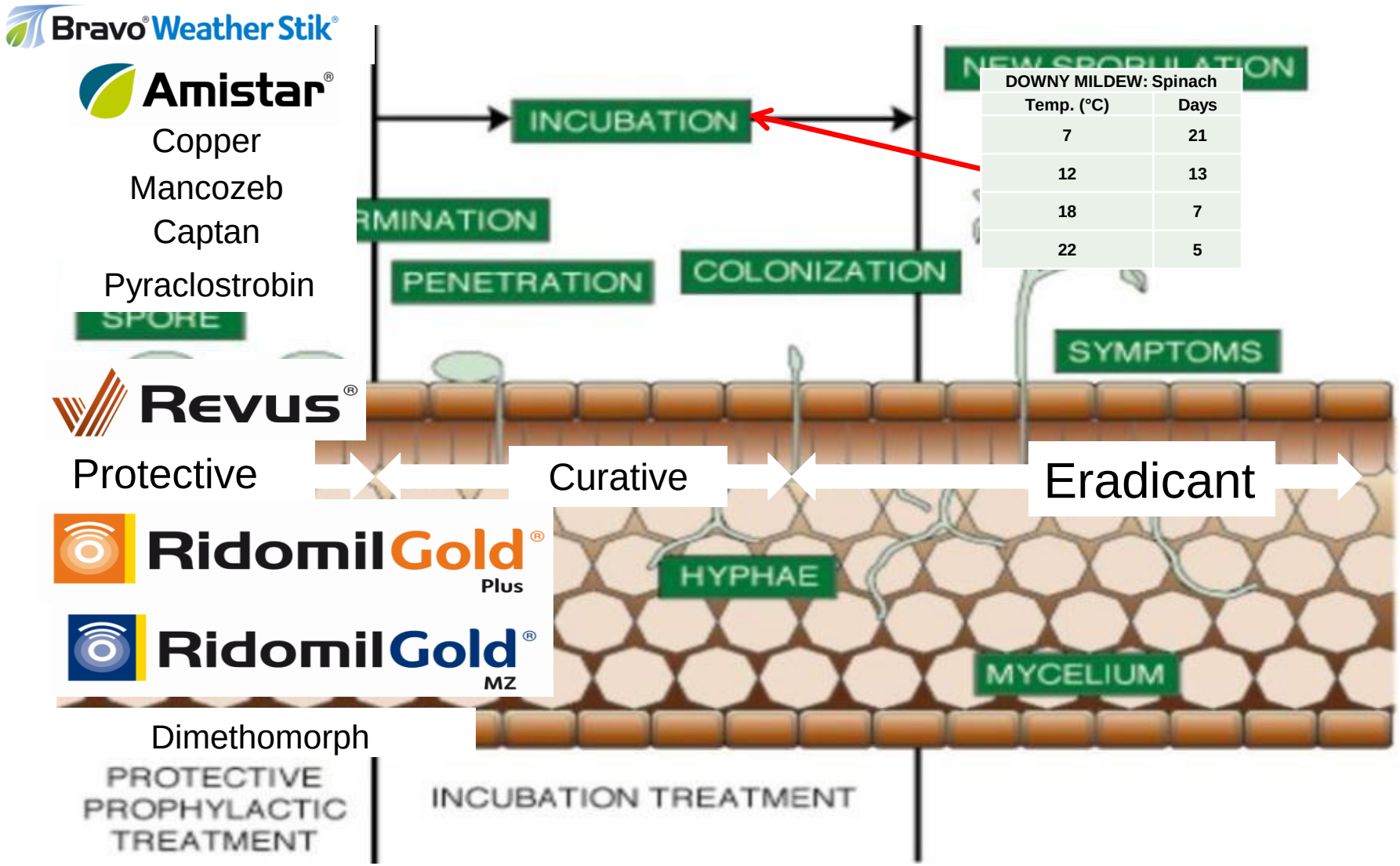
Curative Fungicide

- Applied when the **disease is already present on the crop BUT before symptoms are visible**

Eradicant Fungicide

- Applied to a plant **disease after symptoms are visible**
- There are almost **no fungicide products available with eradicant activity**

Downy Mildew: Disease Management: Where Different Fungicides Work



*** = Best; ** = Good; * = Fair

Insecticides: Whitefly Activity

Product/ (Active)	Action	Activity against Life stages			Comments
		Eggs	Nymphs	Adult	
Admiral (Pyriproxyfen)	**Translaminar**	***	***		Slow acting product and interrupts SLW life cycle. Safe on bees and parasitoids
Applaud (Buprofezin)	**Contact, Vapour**	*	**		Use higher label rate (60ml/ 100L) for SLW control. Safe on bees and parasitoids
Confidor Guard (Imdacloprid)	**Systemic (Xylem Mobile)**		***	**	Only for soil application. Apply at planting
ACATARA (Thiamethoxam)	**Systemic (Xylem Mobile)**		***	**	Only for soil application. Apply at planting
CHESS (Pymetrozine)	**Translaminar / Systemic (Xylem Mobile)**			***	Stops adult feeding. Less toxic to bees. Use at flowering stage in
Talstar (Bifenthrin)	**Contact**	*	*	*	SLW has developed resistance to pyrethroids. Toxic to beneficial insects.
Movento (Spirotetramat)	**Systemic (xylem and phloem mobile)**		***		Slow acting product
PEGASUS (Diafenthiuron)	**Translaminar, Vapour**		***	***	
Eco Oil	**Suffocation**				Good coverage essential. Care should be taken when mixing with soap and fungicides

Reference: Siva Subramaniam, DPI&F, Bowen, June 2005

Identifying the Target

- A spray target is the best time and place to deposit the most appropriate chemical to achieve control of a pest or disease.
- It is made up of both a biological and application target

Biological target refers to the pest that is to be controlled:

- for example, sclerotinia, Pythium or weeds.

Application target is the place where the pesticide spray must be deposited in order for it to work on the biological target for example:

- the soil for Pythium control or the soil (for pre-emergent herbicides).

Reaching the Target Surface

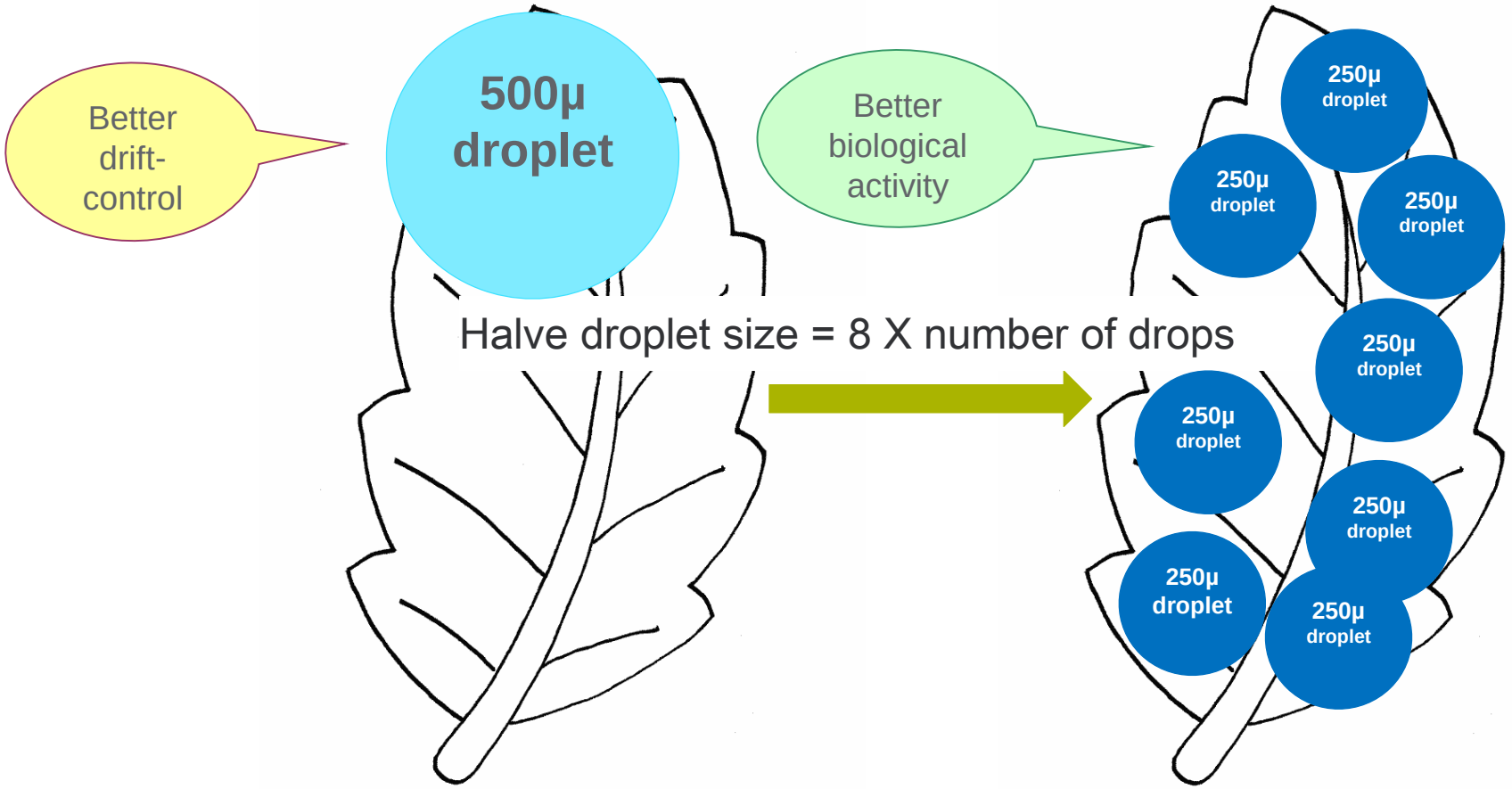
- You must aim to get as much protection on as many leaves as possible
- Getting good coverage only on the tops or outside of plants may not control disease that spread from the lower or inside leaves or fruit.
- Covering the target with an equally distributed deposit is wanted but not always possible

Covering the target with > 20 droplets/ cm2

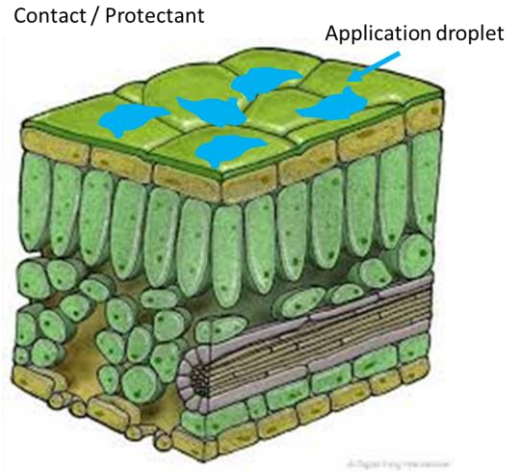
Penetration into the canopy and equal coverage is a challenge

Droplet Size V's Coverage

The same volume can be in few big drops or numerous smaller drops covering more area

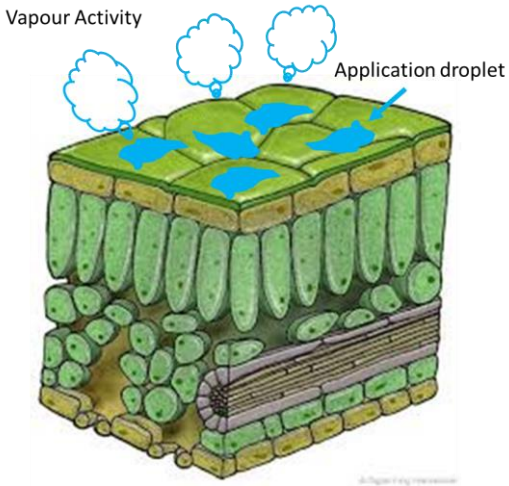


Modes of Movement: General



The droplets are spread on the leaf but the fungicide does not penetrate into it, so only the surface of the plant is protected e.g. THIOVIT JET, BRAVO WEATHERSTIK, copper, mancozeb

- Many of these can be washed off with rain or irrigation

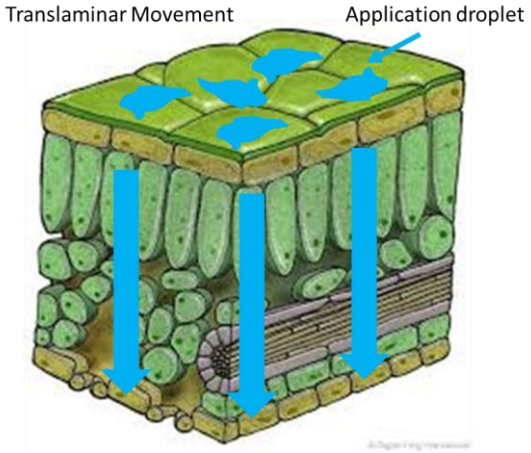


A compound that after being applied to the plant can volatilize and be redistribute to other areas within the canopy

Good coverage is still essential to maximize the performance of these products

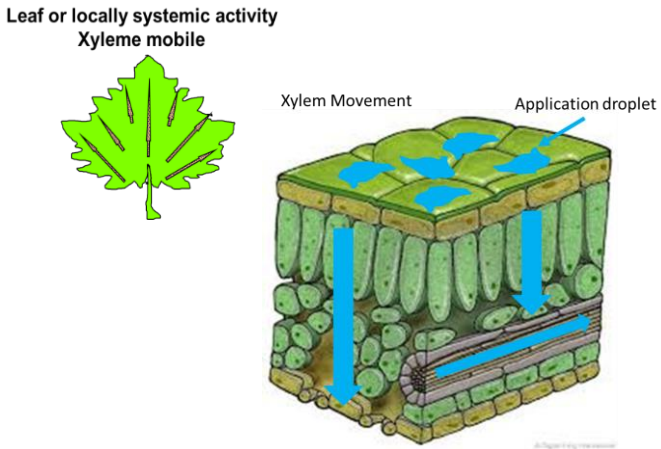
e.g THIOVIT JET, TOPAS,

Modes of Movement: General



A compound applied to one surface of the plant leaf and acts on the other side of the leaf after penetration (not necessarily connected with long distance transport)
e.g. REVUS, PRPOCLAIM

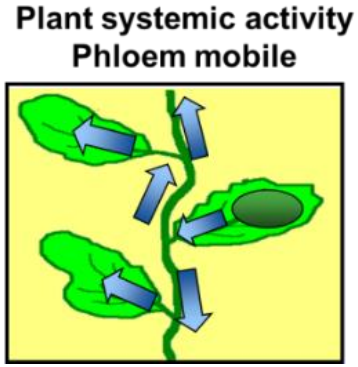
- Can not be washed off the plant
- New growth will not be protected



A compound which is translocated only in direction of the xylem stream; movement is upwards / outwards the growing point of the plant (acropetal, apoplastic) e.g. All DMI's (to a degree), RIDOMIL GOLD MZ, SWITCH

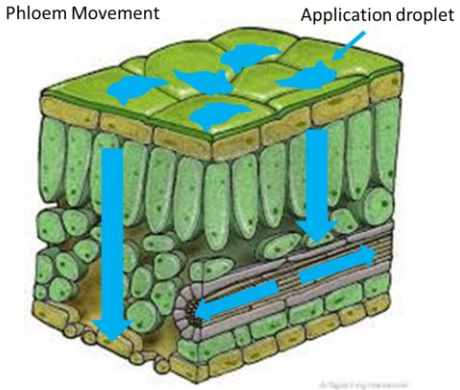
- Can not be washed off the plant
- New may be protected

Modes of Movement: General



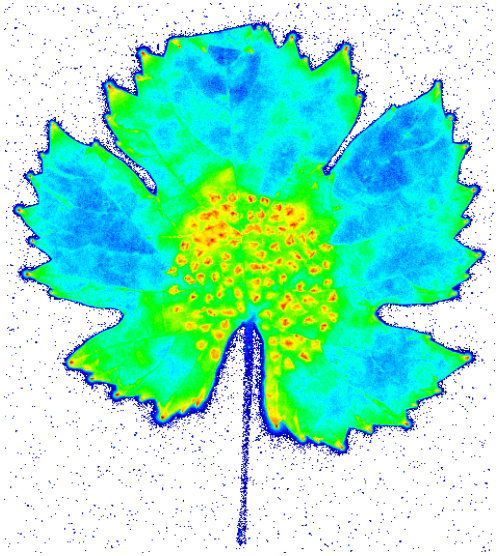
A compound which is translocated in direction of the phloem stream; movement is downwards from the shoots to the roots (basipetal) and upwards in the xylem stream (acropetal)

- Can not be washed off the plant
- New growth will be protected for a period of time



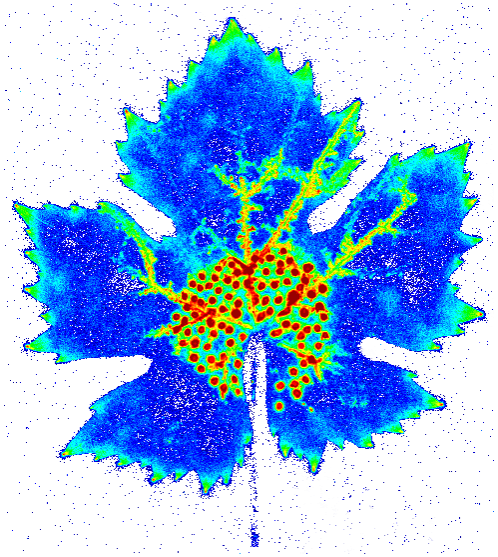
Coverage V's Product Selection

Systemic



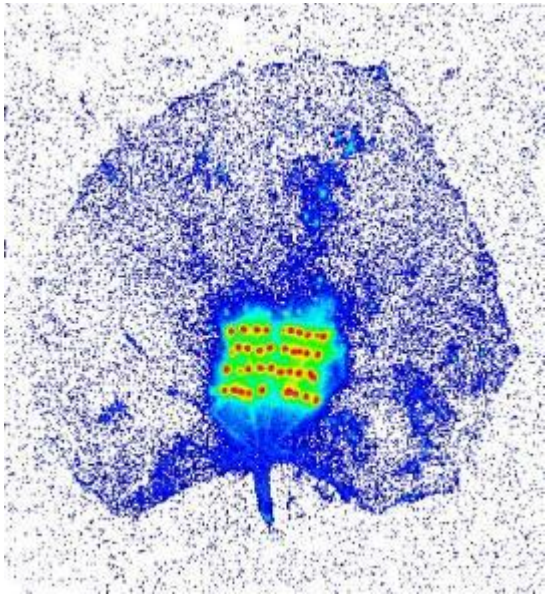
Mefenoxam (Ridomil Gold)

Systemic



Dimethomorph (Acrobat)

Protectant



chlorothalonil

72 hours after application

Radioactivity level

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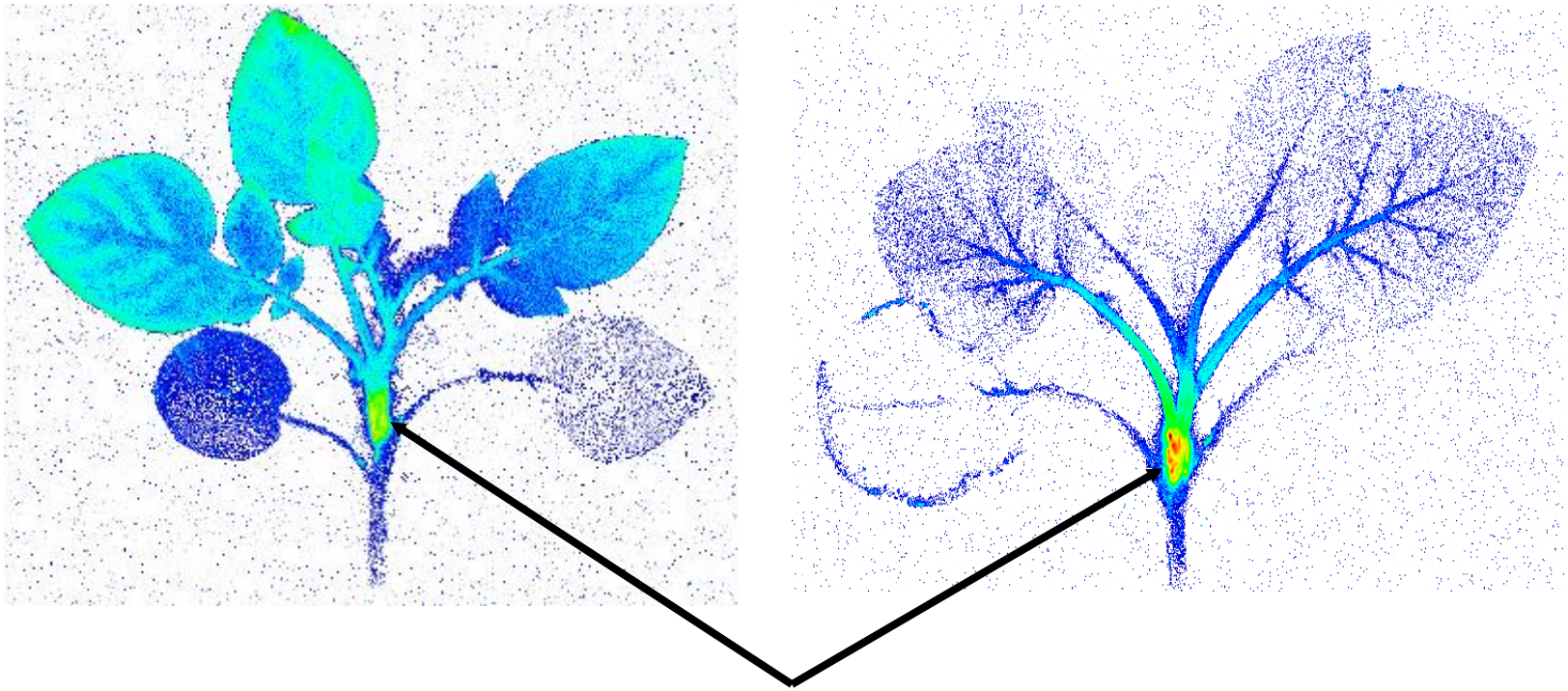
Amistar – Movement from Treated Area Potato

Azoxystrobin

Pyraclostrobin

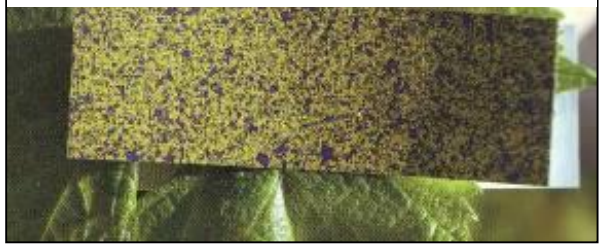


low — high

Site of Fungicide Application

Check the spray distribution

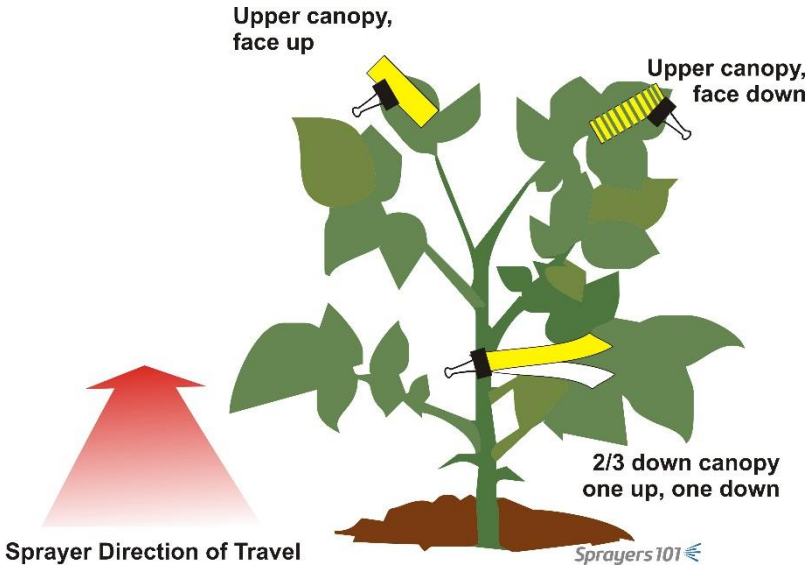
Good even application



Uneven application

Excessive application leading to run off

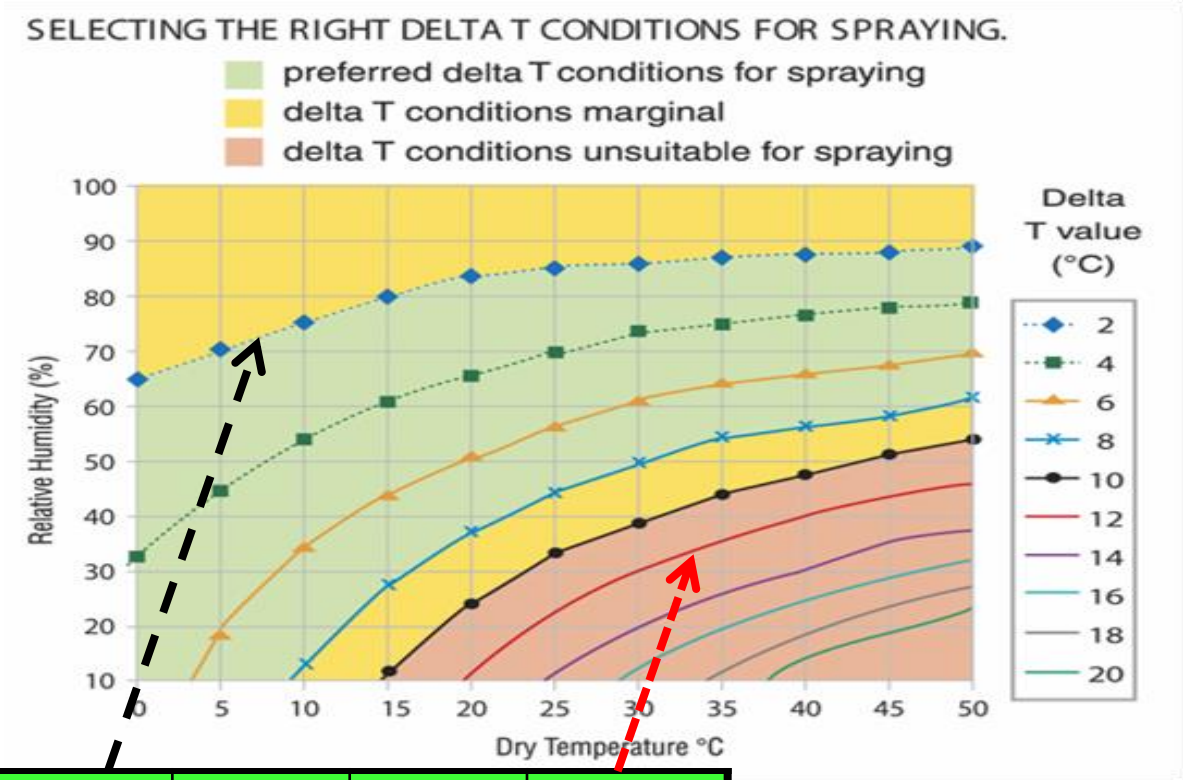
Contact your local Syngenta distributor for water sensitive papers



Check the quality of your spray distribution with the use of water sensitive papers.

Factors That Can Impact Spray Application

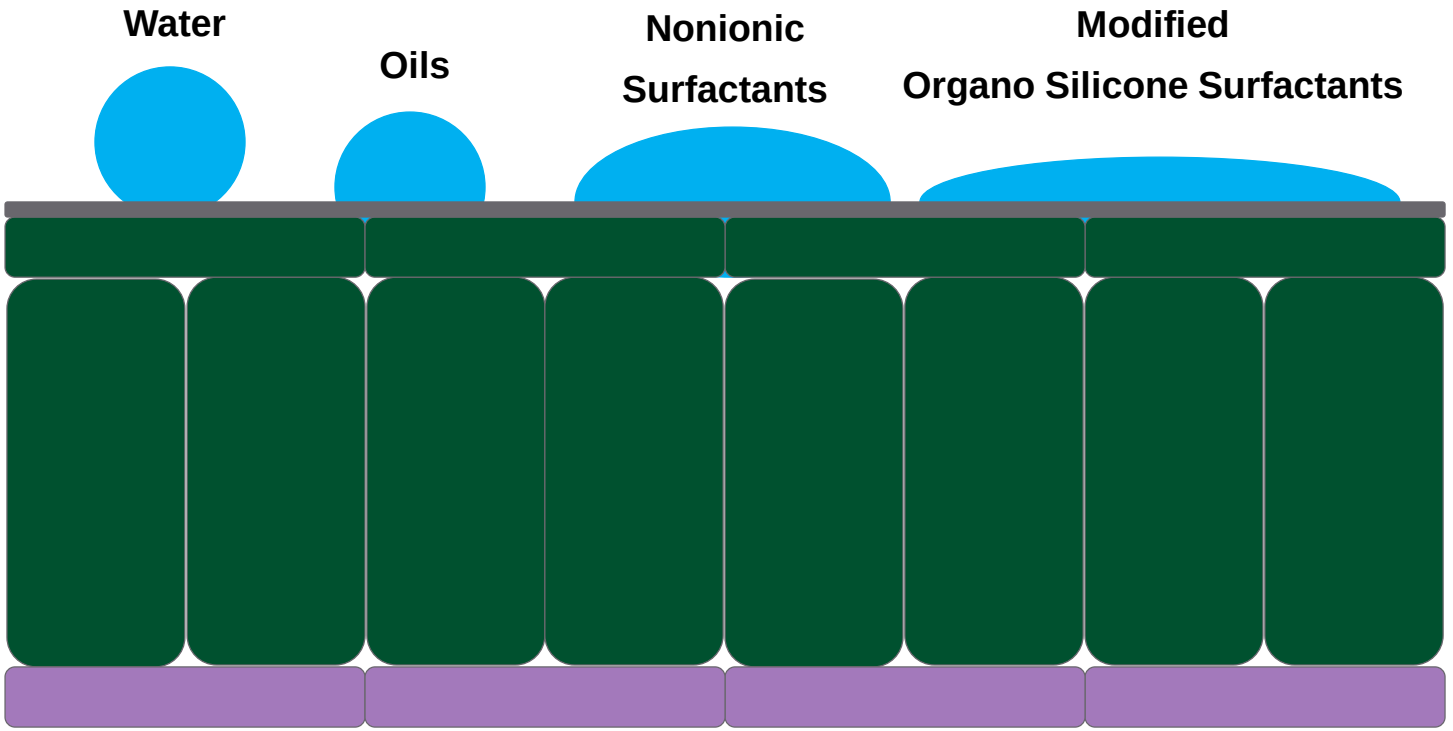
Delta T



Deltat T°C	2	4	8	12
Droplet Diameter (µm)	Survival Time: Seconds			
100	62.50	31.25	15.63	10.42
200	250	125	62.50	41.66
400	1000	500	250	166.66

- A 50µm droplet will evaporate over 250 times quicker than a 200µm droplet.
- On a hot day a 50µm droplet may only travel 0.1 to 1m before it disappears while the 200µm and larger droplets have little to no chance of evaporating before reaching its target.

Adjuvants form Different Droplets



- Contact angles without adjuvant can be large e.g. 95º on upper leaf surface
- This causes:
  - Increases the chance of runoff
  - and decreases the area of contact or absorption for chemical in the water droplet

Tank mix sequence where no order is given on the label

1. Water Conditioners / Compatibility Agents e.g. SoA
2. Water Soluble Bags (WSB)
3. Water Dispersible Granules (WG) e.g. SWITCH, THIOVIT JET
4. Wettable Powders (WP)
5. Suspension Concentrate (SC) e.g. AMISTAR, REVUS
6. Suspo-emulsion (SE)
7. Oil in Water Emulsion (EW)
8. Emulsifiable Concentrate (EC) e.g. TOPAS
9. Soluble Liquids (SL)
10. Micro-nutrients or foliar feed