Wine Australia

The Australian Wine Research Institute

Compliance with regulatory requirements:

new products, new labels, weather and drift risk

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Newly registered agrochemicals in grapes

New for Powdery Mildew

- Cyflufenamid
  - Flute ®
  - Up to EL31 – berries pea size
- Proquinazid
  - Talendo ®
  - Up to 30 days before harvest

New for Botrytis

- Fenpyrazamine
  - Prolectus ®
  - Up to 80% cap fall

New for Downy Mildew

- Amisulbrom + tribasic copper sulfate
  - Amicus blue ®
  - Up to pea-size berries

- Ametoctradin + dimethomorph
  - Zampro ®
  - Up to 80% capfall

New for Eutypa Dieback

- For Eutypa control:
  - Cyproconazole + iodocarb
    - Garrison Rapid ®
  - Fluazinam
    - Emblem ®
  - Tebuconazole
    - Gel Seal ®, Greenseal ®
- Post-pruning / dormancy sprays

Agrochemicals no longer available

- Fenarimol
  - no longer available for Powdery Mildew
- Fenamiphos
  - no longer available for nematodes
- Fenthion
  - insecticide no longer available
- Parathion methyl
  - insecticide no longer available

Fungicide Resistance

Resistance in Powdery Mildew

Assessment of Australian vineyards (2013-2016)

	Number of sites tested	Reduced sensitivity	Mutant present (%)
Cabrio® pyraclostrobin[1,2]	94	53%	86%
Topas® penconazole[1]	38	0	68%
Mycloss® myclobutanil[1]	66	14%	84%
Domark® tetraconazole[1]	21	0	82%

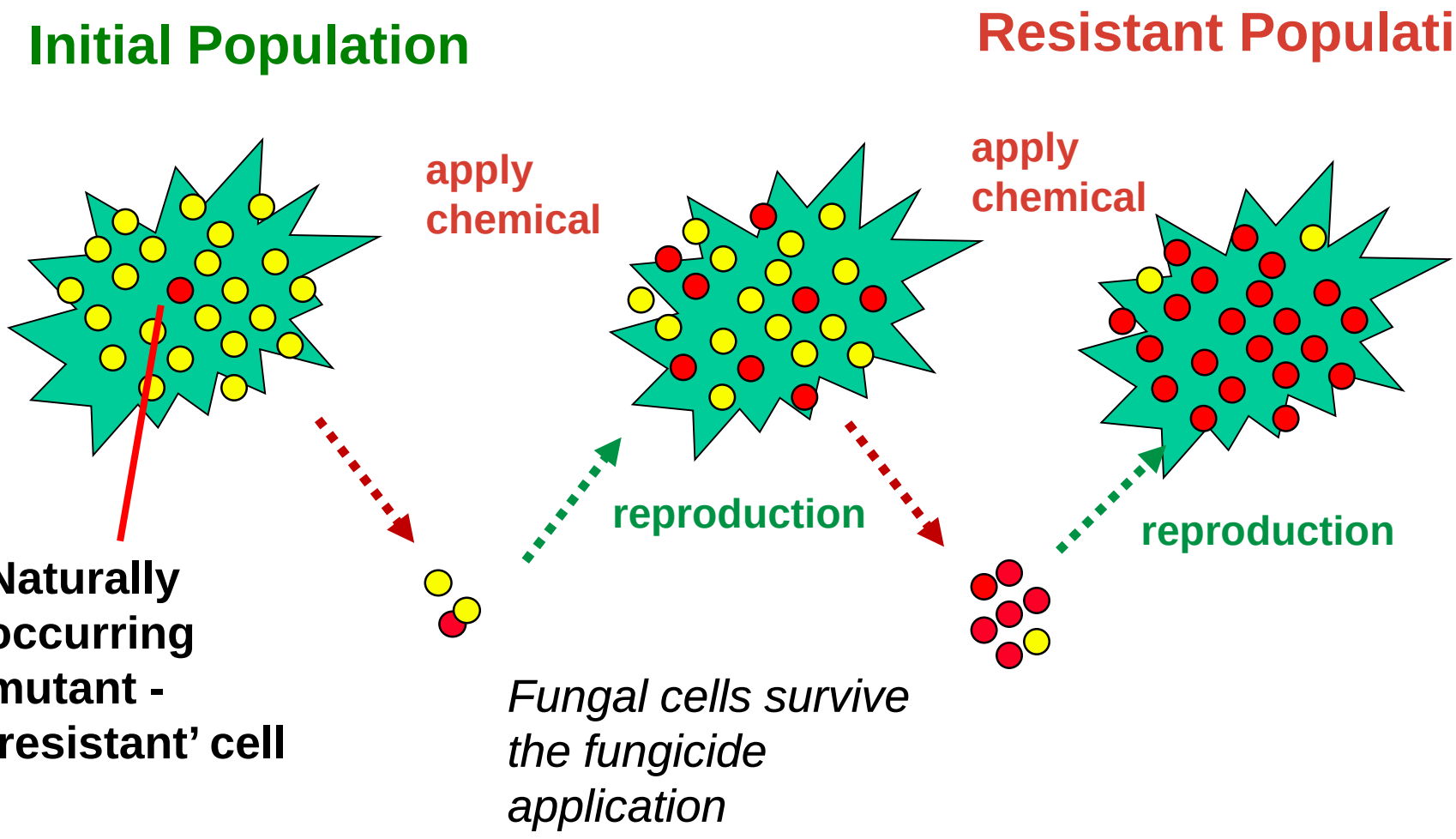
[1] EC_{50} >1.0 µg/mL [2] Discriminatory dose , >20% growth at 1.0 µg/mL

Data courtesy of B. Hall & S. McKay,
South Australian Research & Development Institute

Government of South Australia
Primary Industries and Regions SA

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Resistant fungal cells need to survive then reproduce



Graphic courtesy W Wilcox
Cornell University, USA

Resistance Management

Rotate or mix different modes of action

Use label rates

Limit total number of applications per fungicide group

Understand fungicide activity, modes of action & resistance groups

Start a fungicide program with a multi-site MOA to reduce populations – **DO NOT** use single site MOA to control well-established infections

TIMING is critical

Information courtesy
University of California
Davis, USA

Agrochemicals registered for use in Australian viticulture

- The AWRI ‘Dog Book’ keeps you up to date

- Know which products have:
  - recently been registered
  - changed use (eg: use on another disease)
  - been reregistered for use in viticulture

www.awri.com.au/industry_support/viticulture/agrochemicals/agrochemical_booklet

Compliance

Keeping records

- Details that you are used to recording:
  - 1. date with start and finish times of application;
  - 2. location address and paddock/s sprayed;
  - 3. full name of this product;
  - 4. amount of product used per hectare and number of hectares applied to;
  - 5. crop/situation and weed/pest;
  - 6. name and address of person applying this product.

Recent labels include new details

- **Additional records are mandatory for some agrochemicals**
  - Relate to:
    - Weather
    - Equipment

- **Directions for Use** panel on the label includes **Restraints**
  - May relate to:
    - Nozzles
    - Equipment set up
    - Weather
    - Maximum applications (to manage resistance)
    - Buffer zones
    - Spraying near waterways

Recently registered products (& new label wording)

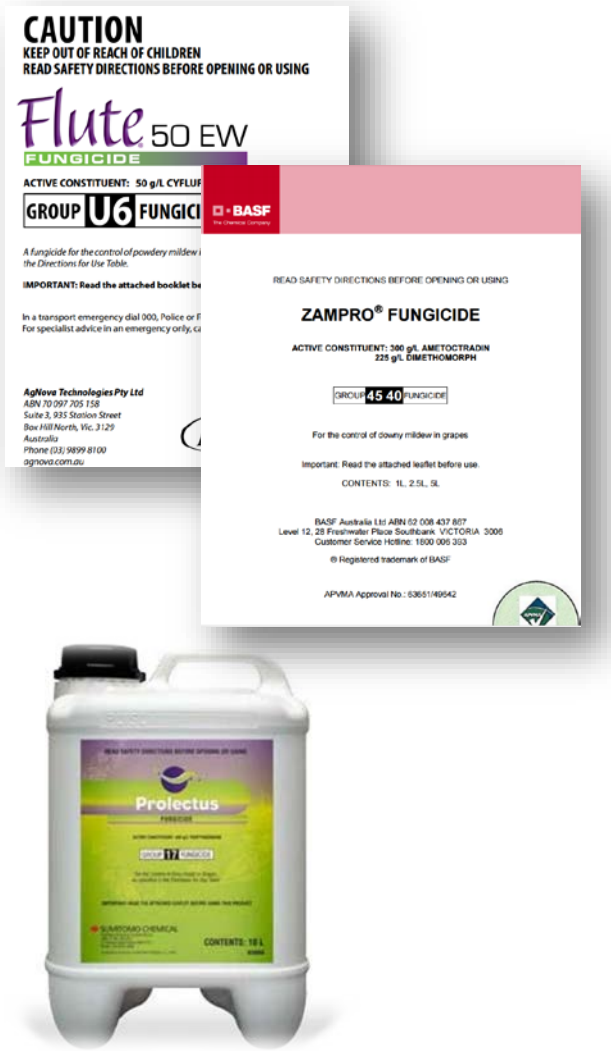
- Talendo ®
- Flute ®
- Vivando ®
- Cyflamid ®
- Transform ®
- Delegate ®
- Success ®
- Zampro ®
- Revus ®
- Altacor ®

Read the Label !

Spray records – additional details may be required

- Details that must be recorded:
  - 1. date with start and finish times of application;
  - 2. location address and paddock/s sprayed;
  - 3. full name of this product;
  - 4. amount of product used per hectare and number of hectares applied to;
  - 5. crop/situation and weed/pest;
  - 6. wind speed and direction during application;
  - 7. air temperature and humidity;
  - 8. nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application;
  - 9. name and address of person applying this product.

Labels – restraints on weather conditions



- DO NOT apply when wind speed is less than 3 or more than 20 km/h at the application site.

- DO NOT apply during surface temperature inversion conditions at the application site.

Spraying conditions – suitable

- Wind between 3 and 20 km/hr

Spraying conditions - unsuitable

- Wind between 3 and 20 km/hr ???

www.willyweather.com.au

Labels – restraints on weather conditions

- DO NOT apply when wind speed is less than 3 or more than 20 km/h at the application site **as measured 15 metres outside of the vineyard on the upwind side**.

- DO NOT apply during surface temperature inversion conditions at the application site.

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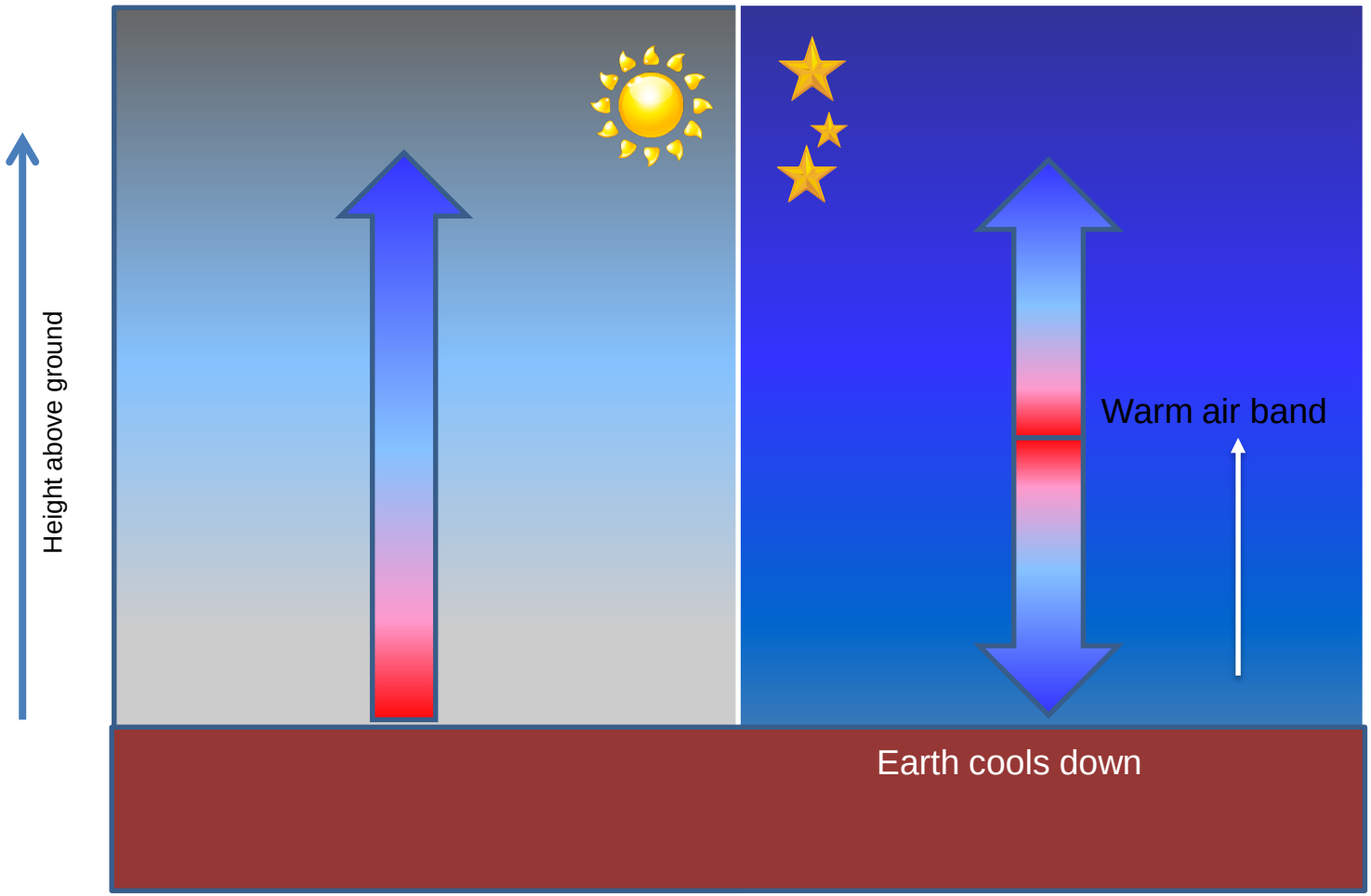
Spraying conditions – unsuitable

Photo credit: J.D. Griggs

Photo credit: DPI Victoria

Typical profile of temperatures night and day



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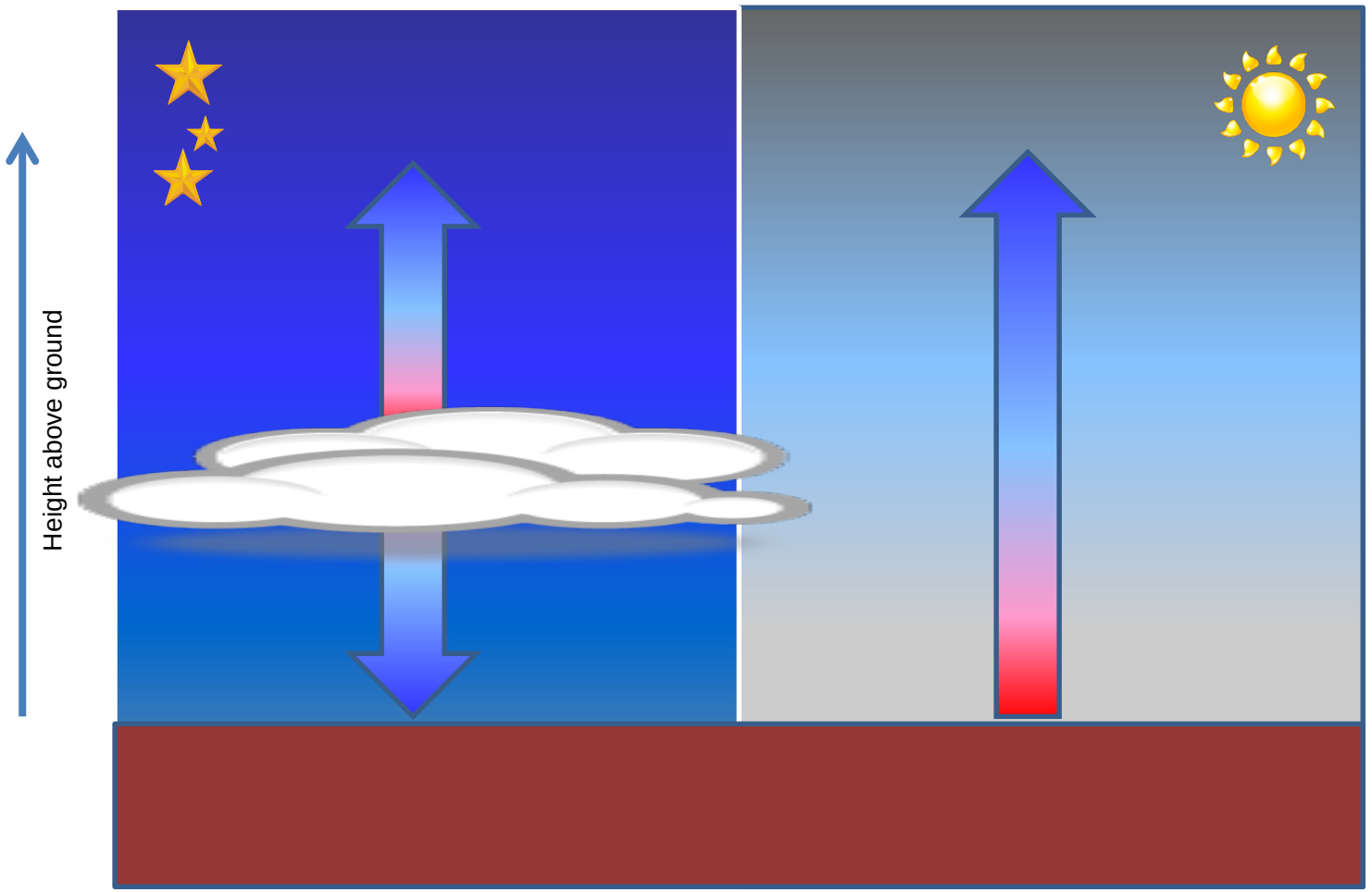

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Droplet evaporation in HUMID conditions

- High relative humidity
- Low temperature
  - Some or no evaporation of droplets

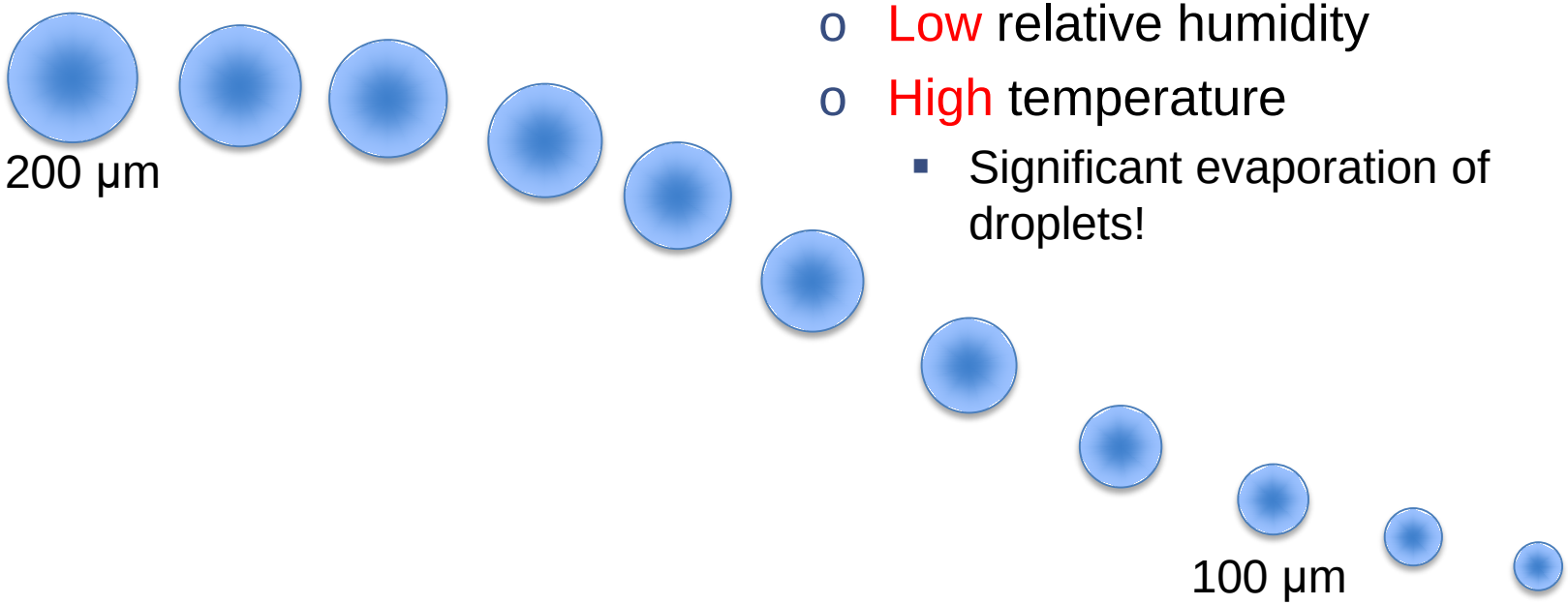
200 µm

Fall distance

Wind

200 µm

Droplet evaporation in DRY conditions



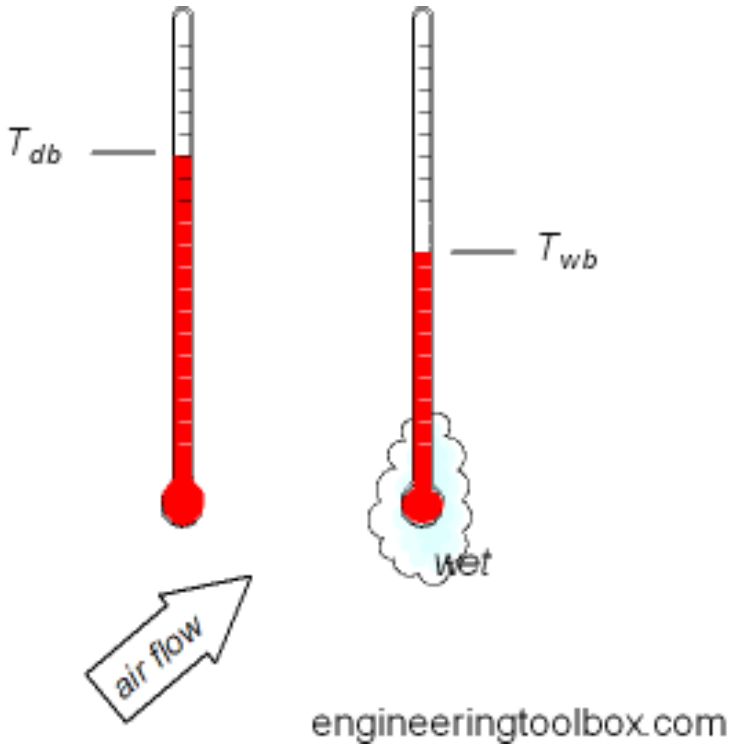
- Low relative humidity
- High temperature
  - Significant evaporation of droplets!

- Halving the diameter by evaporation concentrates the droplet ×8

Delta T:
interaction between temperature and humidity

Dry Bulb Temperature (Tdb)

- Ambient air temperature, measured by a thermometer
- Tdb is not affected by moisture, only by heat in the air

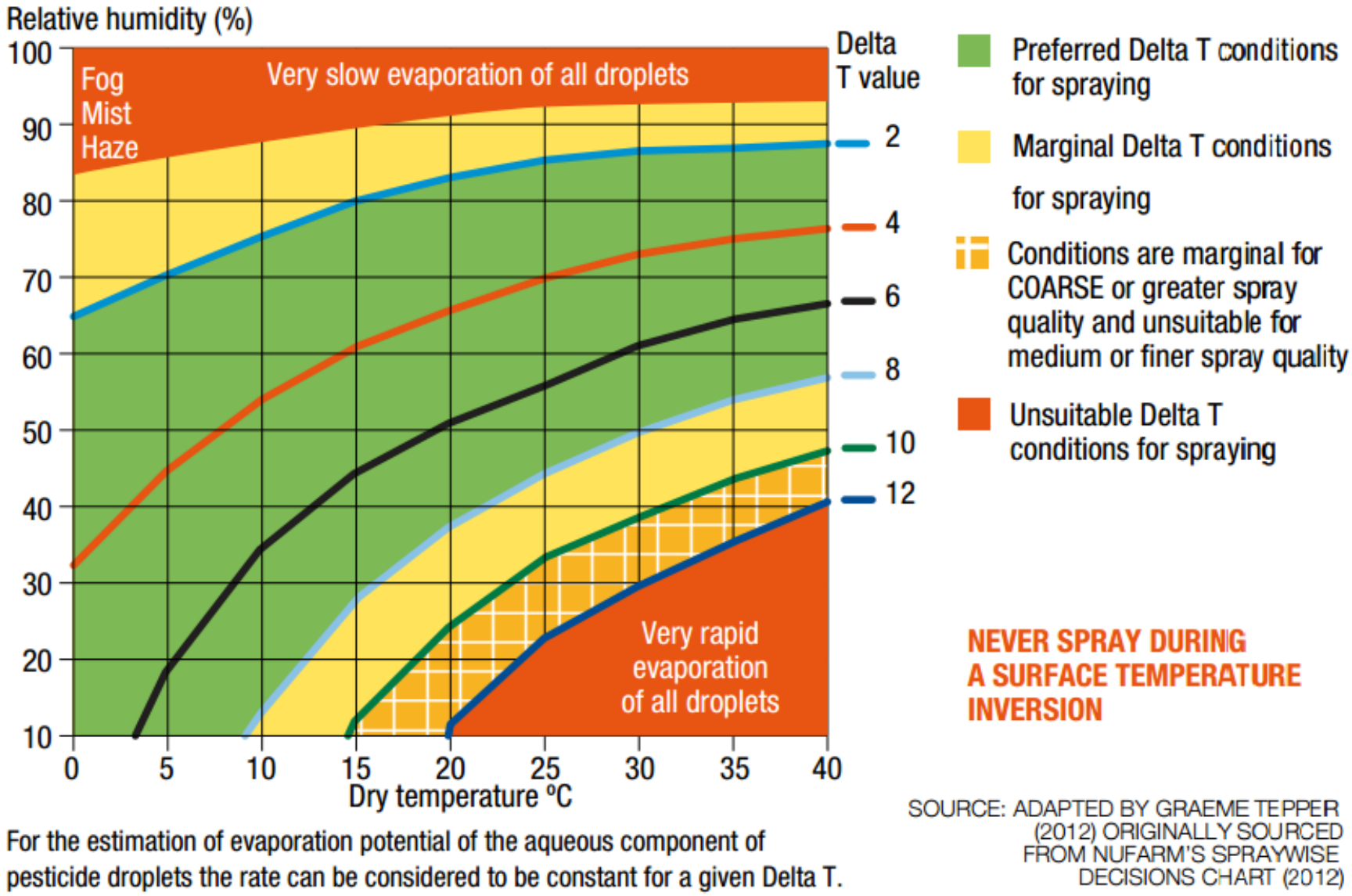


Wet Bulb Temperature (Twb)

- Indicated by a moistened thermometer bulb exposed to air flow
- Evaporation of water has a cooling effect, so Twb is lower than the Tdb of the air

Delta T (ΔT) is the difference between dry and wet bulb temperatures (ΔT = Tdb - Twb)

Delta T



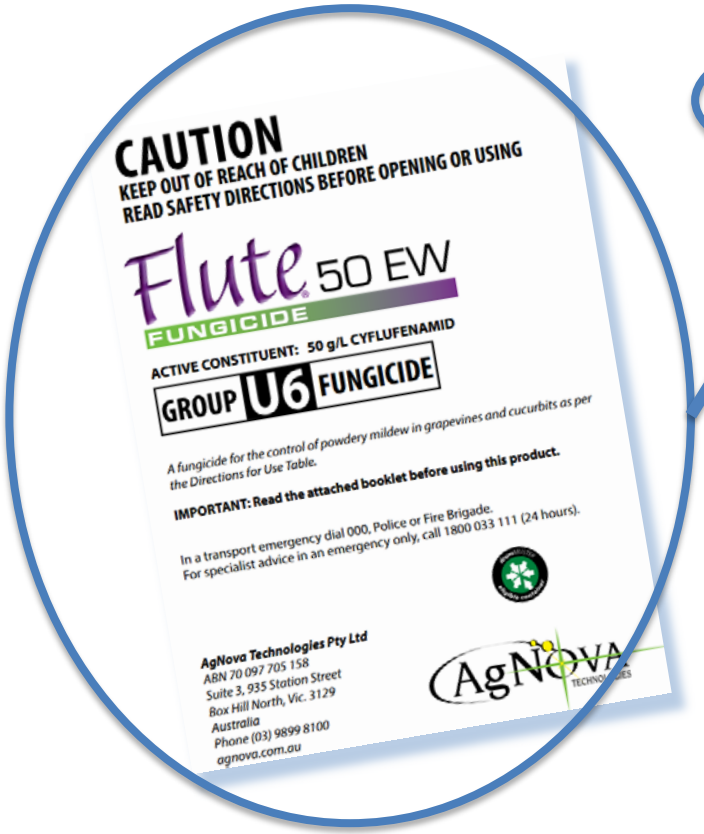
For the estimation of evaporation potential of the aqueous component of pesticide droplets the rate can be considered to be constant for a given Delta T.

SOURCE: ADAPTED BY GRAEME TEPPER (2012) ORIGINALLY SOURCED FROM NUFARM'S SPRAYWISE DECISIONS CHART (2012)

New labels – restraints on nozzles

DO NOT apply with spray droplets smaller than a **MEDIUM** spray droplet size category according to nozzle manufacturer specifications that refer to the ASAE S572 Standard or the BCPC Guideline.

New labels – restraints on nozzles



- Except when applying with vineyard airblast equipment,

DO NOT apply with spray droplets smaller than a **MEDIUM** spray droplet size category according to nozzle manufacturer specifications that refer to the ASAE S572 Standard or the BCPC Guideline.

Pressure affects droplet spectrum from nozzles

HCA / ATR 80° - Hollow Cone

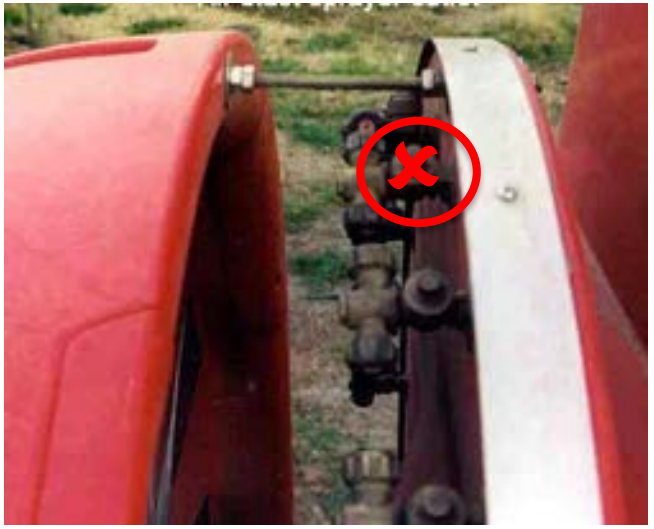
	40 PSI	50 PSI	60 PSI	70 PSI	80 PSI	90 PSI	100 PSI	125 PSI	150 PSI	350 PSI
ATR-White	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
HCA-01	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
ATR-Lilac	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
HCA-015	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
ATR-Brown	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
HCA-02	F	F	VF	VF	VF	VF	VF	VF	VF	VF
ATR-Yellow	F	F	VF	VF	VF	VF	VF	VF	VF	VF
HCA-025	F	F	F	VF	VF	VF	VF	VF	VF	VF
ATR-Orange	F	F	F	F	VF	VF	VF	VF	VF	VF
HCA-03	F	F	F	F	F	VF	VF	VF	VF	VF
ATR-Red	F	F	F	F	F	F	VF	VF	VF	VF
HCA-045	M	F	F	F	F	F	F	VF	VF	VF
ATR-Green	M	M	F	F	F	F	F	F	VF	VF
ATR-Blue	M	M	M	M	F	F	F	F	F	F

www.sherwoodpumps.com

Labels – restraints on equipment

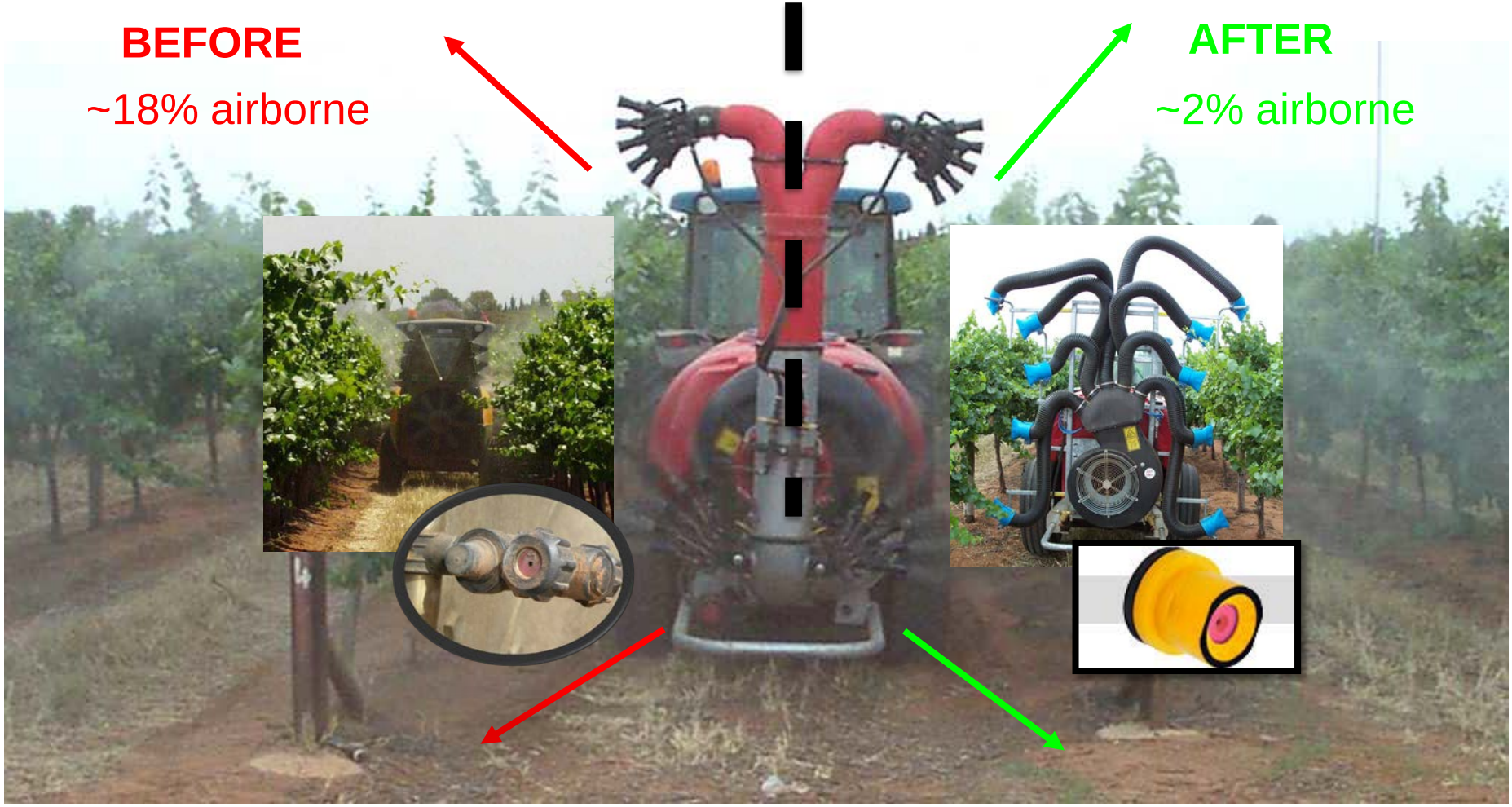
DO NOT direct the spray above vines during airblast applications.

- TURN OFF outward pointing nozzles at row ends and outer rows during airblast applications.



Equipment adjustment

Tested three machines with eight setups (varying nozzles and air)



Spray records – new detail is required

- Users of this product MUST
  - make an accurate written record of the details of each spray application
  - within 24 hours following application
  - Keep this record for a minimum of 2 years

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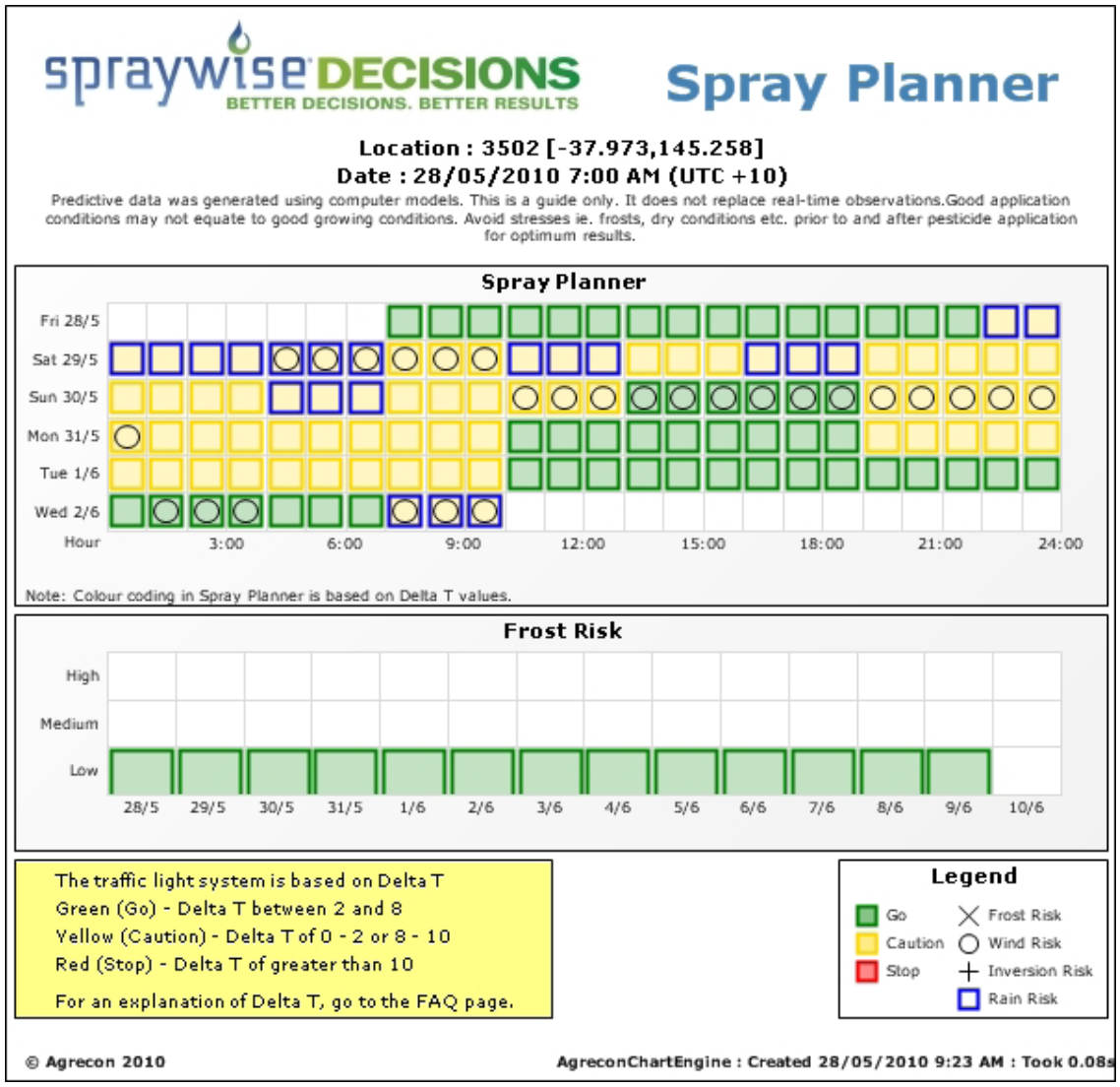
Was Delta T suitable?

Was droplet size suitable?

Decision support is available



Bureau of Meteorology and other web sources provide support to help growers assess weather conditions before spraying