

2018/2019 SPRAY PROGRAMME – CONVENTIONAL



| STAGE | TIMING | TARGET | REASON | PRODUCT | RATE/100 L | WATER/HA | COMMENTS |
|---------------------------------------------------------------------------------------------|-------------------------------------------|--------------------|------------------------------------------------------------------------|----------------------------------------|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  FLUFFY BUD | 5–7 days pre-budbreak | Psa-V | Protective layer over wounds from frost damage, and to lower inoculum | Nordox75WG OR Kocide Opti | 55–70 g 70–90 g | 600–800 L | Use of a super-spreader such as Du-Wett at 400 ml/ha is industry best practice. |
|  BUDBREAK | Vegetative growth showing | Psa-V | Protection of new growth | Kocide Opti OR Nordox 75WG | 70–90 g 37.5 g | 600–800 L | Aim to apply before significant weather events. Where Psa-V has been an issue ensure new growth is protected. Use of a super-spreader such as Du-Wett at 400 ml/ha is industry best practice. |
|  BUDPHASE | Shoot extension (1–2 weeks post budbreak) | Psa-V | Reduce inoculum in high risk orchard during high infection risk period | Kasumin (AI Nozzles) | 500 ml | 800–1000 L Tank mix | Maximum 1 application in bud phase. Must complete an OPIS form and register an Intent to Spray . Refer to Kasumin User Guide on canopy website. A second application can be made under JA. |
| | | | Protection of new growth | Kocide Opti OR Nordox 75WG | 70–90 g 37.5 g | | Aim to apply before significant weather events. Where Psa-V has been an issue ensure new growth is protected. Use of a super-spreader such as Du-Wett at 400 ml/ha is industry best practice. |
| | 30-40 days pre-flower (before Labour Day) | Psa-V on HE and HW | Reduce sepal staining and flower loss | PRE-FLOWER GIRDLE | | | Apply to Hayward and Green14 in areas where Psa flower bud browning has been an issue previously. Don't girdle stressed vines. |
| | Shoot extension (2–3 weeks post budbreak) | Vine health | Improve vine health and nutrition | Acadian seaweed OR Wuxal Ascofol | 100 g 300 ml | 1000 L | Leave 5–7 days between seaweed and copper applications. |

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|  BUDPHASE | Shoot extension (4-5 weeks post budbreak) | Psa-V | Trigger systemic protection | Actigard | 20 g (200 g/ha) | 1000 L Tank mix | Aim for use when leaves are 25 mm diameter. Takes 4-7 days to activate the plant response. Don't use on stressed vines e.g. young vines, wet roots, frost damaged. |
| | | | Continued protection of expanding growth | Kocide Opti <u>OR</u> Nordox 75WG | 70-90 g 37.5 g | | Aim to apply before significant weather events. Where Psa-V has been an issue ensure new growth is protected. Use of a super-spreader such as Du-Wett at 400 ml/ha is industry best practice. |
|  PRE-FLOWERING | 10 days pre-flowering | Psa-V | Continued protection | Kocide Opti <u>OR</u> Nordox 75WG | 70-90 g 37.5 g | 1000 L | Aim to apply before significant weather events. Where Psa-V has been an issue ensure new growth is protected. Use of a super-spreader such as Du-Wett at 400 ml/ha is industry best practice. |
| | Pre-flowering | Yield | Crop loading and defect removal | FLOWER BUD THINNING | | | Target misshapen flower buds. If you have excess numbers reduce by targeting lateral and then king flower buds |
| | 5 days pre-flowering | Leafroller | Reduce pest damage | Prodigy | 30-50 ml (300-500 ml/ha) | 1000 L Tank mix | Refer to Prodigy rate guide on p. 6. 5-day interval between Movento and Copper. To increase the efficacy of Movento use a super-spreader such as Du-Wett at 400 ml/ha, is recommended. |
| | | Scale | Premium market access | Movento 100SC | 96 ml (960 ml/ha) | | |
| | 2 days pre-flowering | Sclerotinia | Reduce infection pressure | Luna Privilege | 30 ml (300 ml/ha) | 1000 L Tank mix | Both products have restrictions once flowering starts due to residue concerns. Consider cultural controls for <i>sclerotinia</i> such as keeping an open canopy and moving from a spray strip to a grass sward. |
| Psa-V | | Trigger systemic protection | Actigard | 20g (200 g/ha max) | | | |
|  FLOWERING | Flowering | Yield | Convert flowers to fruit | POLLINATION | | | Bees, supplementary or replacement. Enter your fruitset date in spray diary. |
| | Flowering to petal fall | Sclerotinia | Reduce risk of crop damage | Timorex Gold | 100 ml | 1500 L | Apply up to 2 applications during high disease risk period. Do not apply while bees are foraging. |
|  POST-FRUITSET | 1-2 days post fruitset | Vine health | Improve vine health and nutrition | Acadian seaweed <u>OR</u> Wuxal Ascofol | 100 g 300 ml | 1000 L | Leave 5-7 days between seaweed and copper applications. |
| | 7 days post fruitset | Psa-V | Reapply protection | Kocide Opti <u>OR</u> Nordox 75WG | 70-90 g 37.5 g | 1000-1500 L | Pay extra attention, making sure any pruned males are covered. Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |

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|-------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|------------------------------------------------------------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  POST-FRUITSET | 10–14 days post fruitset | Leafroller | Reduce pest damage | Proclaim OR BioBit DF | 2 g 50 g | 1000–1500L | Use if leafroller is present. Don't spray while bees are in the orchard. BioBit – minimum 1 kg/ha. |
| | 10-20 days post fruitset | Yield | Increase fruit size | SIZE GIRDLE | | | Decide whether the maturity area requires a size increase. Consider previous performance and the current crop loading and seasonal target. Don't girdle stressed vines. |
| | December | Passion Vine Hopper (PVH) | Reduce incidence of sooty mould via PVH control | PyGanic Wetcit | 100–500 ml 200–300 ml | 1000–1500 L Tank mix | Spray shelterbelts if high numbers of nymphs are noticed. PyGanic has a reduced risk of residues compared to alternatives in this period. Aids spreading and knock down effect. |
|  MONITORING | January to March | Psa-V | Continued protection | Kocide Opti OR Nordox 75WG | 70–90 g 37.5g | 1000–1500 L | Target spraying to weather events. Note that monitoring results aren't required for Psa-V spraying. Use super-spreader such as Du-Wett at 400 ml/ha. |
| | January to March | Leafroller | Monitoring results above the threshold required to justify spray application | Proclaim OR BioBit DF | 2 g 50 g | 2000 L Tank mix | Don't spray while bees foraging in the grass sward (Proclaim 42 day withholding, 2 days for BioBit). Lower water rate to 1000–1500 L if not using oil. |
| | | Scale | | Excel Oil OR D-C-Tron Oil | 1 L | | Oil has a 14 day withholding period. See additional notes for fruit skin sensitivity periods. |
| | January to March | Taste | Increased dry matter | DRY MATTER GIRDLE/S | | | Only girdle healthy vines. Use sterilised tools and ensure you are not cutting into xylem. If applying multiple girdles monitor healing time and vine health before reopening or applying a new girdle. Consult your Grower Services or Technical Rep for further advice |
|  PRE-HARVEST | March/April | Psa-V | Continued protection | Kocide Opti OR Nordox 75WG | 70–90 g 37.5 g | 1000–1500 L | Target March and April spraying to weather events (7 day withholding period). Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |
| | April to June | Stain | Remove stain | Kiwilustre LF OR Jewel LF | 500 ml 500 ml | 3000 L | Spray 6–24 hours before harvest. Clearance samples will not be collected if fruit are wet or spraying is occurring in adjacent blocks. |

HARVEST

| STAGE | TIMING | TARGET | REASON | PRODUCT | RATE/100 L | WATER/HA | COMMENTS |
|-----------------|---------------------------|---------------------|------------------------------------------------------|----------------------------------|-----------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POST HARVEST | Immediately after harvest | Psa-V | Fruit stalks and vine | Kocide Opti OR Nordox 75WG | 70-90 g 55-70 g | 1000-1500 L | Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |
| | Immediately after harvest | Psa-V | Believed to trigger systemic protection | Actigard | 20 g (200 g/ha) | 1000 L | Can be used while leaves still actively photosynthesising, generally excludes the later part of the harvest window. Takes 3-7 days to activate the plant response. Don't use on stressed vines e.g. young vines, wet roots, frost damaged. Take care to avoid spray drift onto unharvested areas. |
| | After harvest | Cicada / PVH | Reduce sooty mould – target honeydew producing pests | Talstar 100EC | 100 ml | 1000 L Tank Mix | Label recommends 1 L + 1 L per hectare of each product. Use once leaf drop allows good cane coverage. Apply pre-pruning if target is cicada, post-pruning if target is PVH. Double mulch canes after pruning to reduce cicada eggs. |
| Penetrant | | | Engulf | 100 ml | | | |
| PRE-PRUNING | Winter | Psa-V | Reduce inoculum prior to creation of pruning wounds | Nordox75WG OR Kocide Opti | 55-70 g 70-90 g | 600-800 L | Winter rates on dormant vines. Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |
| | Winter | Soil Health | Annual check | SOIL TEST | | | Submit sample for analysis of nutrient levels and request a fertiliser recommendation. |
| POST PRUNING | Winter | Psa-V | Protectant layer over fresh wounds | Nordox75WG OR Kocide Opti | 55-70 g 70-90 g | 600-800 L | Winter rates on dormant vines in response to weather events. Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |
| | Winter | Vine | Improve budbreak | Hydrogen cyanamide (HC) | 6 L | | 600-700 L |
| | | | | Drift Stop | 200 ml | | |
| | Winter | Psa-V | Reapply protection over dormant canes | Nordox75WG OR Kocide Opti | 55-70 g 70-90 g | 600-800 L | Use winter rates on dormant vines. Use of a super-spreader such as Du-Wett at 400 ml/ha, is industry best practice. |
| Before budbreak | Soil | Replenish nutrients | APPLY BASE FERTILISER | | Follow rates suggested in your fertiliser recommendation. | | |

SPRAY TIMING

SPRAY INTERVALS:

| DAYS BEFORE | | | | | | | | DAY OF SPRAYING | DAYS AFTER | | | | | | | |
|----------------|---|---|---|-------------------|---|---|---|-----------------|------------|---|---|---|---|---|---|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Talstar/Engulf | | | | Copper | | | | Talstar/Engulf | | | | | | | | |
| Talstar/Engulf | | | | Budbreak Enhancer | | | | Talstar/Engulf | | | | | | | | |
| HC | | | | | | | | Copper | HC | | | | | | | |
| Movento | | | | Copper | | | | Movento | | | | | | | | |
| Oil | | | | Copper (Winter) | | | | Oil | | | | | | | | |
| Oil | | | | | | | | Copper (Summer) | Oil | | | | | | | |
| Copper | | | | | | | | Seaweed | Copper | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Intervals between certain chemicals are necessary to avoid a reduction in efficacy and/or phytotoxicity. These are the minimum intervals recommended between applications. For example, if you apply Movento 5 days is needed before a copper product is applied. If trying a new product check with your merchant for information the interaction with other chemicals, especially copper.

FRUIT SKIN SENSITIVITY PERIODS:

| | DAYS AFTER FRUIT SET | | | | | | | | | | | | | | |
|----|----------------------|---|----|------|------|----|----|----|----|----|----|----|----|--|--|
| | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 80 | | |
| HW | | | | Risk | | | | | | | | | | | |
| GA | | | | | Risk | | | | | | | | | | |

Avoid damaging fruit during the risk periods above by minimising activity in the orchard during this time. Plan spraying and canopy work such as pruning or thinning for before or after the risk period. What looks like a small amount of damage at the time can worsen as the fruit expands in size.

RE-ENTRY AND PRE-HARVEST INTERVALS

| PRODUCT | PRE-HARVEST INTERVAL (PHI) |
|-----------------------------------|----------------------------|
| <i>Bacillus thuringensis</i> (Bt) | 2-days |
| Copper | 7-days |
| Wuxal Ascofol | 7-days |
| Pyrethrum | 14-days |
| Mineral Oil | 14-days |
| Acadian Seaweed | 14-days |
| Stimplex | 14-days |
| Emamectin (Proclaim) | 42-days |
| Foliar Urea (All) | 50-days |
| Greenseals Pyrethrum | 120-days |
| RE-ENTRY INTERVAL (REI) | |
| Copper | When Fully Dry (WFD) |
| Prodigy | WFD |
| Proclaim | WFD |
| Bt | WFD |
| Pyrethrum | WFD |
| Mineral Oil | WFD |
| Timorex Gold | WFD |
| Clean-up spray | WFD |
| Ambitious | WFD |
| Movento | 12-hours |
| Actigard | 12-hours |
| Luna Privilege | 1-day |
| Rovral | 1-day |
| Talstar | 2-days |
| Kasumin | 2-days |
| Hydrogen cyanamide | 5-days |
| Mesurool (JA only) | 7-days |

INSECT PEST CONTROL

PEST MONITORING PERIODS:

| TIMING AFTER FRUITSET | | |
|-----------------------|---------|------------|
| | SCALE | LEAFROLLER |
| HW, G14 | 8-weeks | 5-weeks |
| GA | 8-weeks | 7-weeks |

Please provide us with your fruitset date so we can monitor at the correct time.

PEST THRESHOLDS:

| LEAFROLLER THRESHOLDS | | SPRAY ALLOWANCE |
|-----------------------|-------|--------------------------------------------------------------------------|
| NORMAL MONITORING | >0.5% | 1 application before next monitor result |
| 4 WEEKS PRE-HARVEST | >0.1% | 1 application before next monitor result (consider re-entry interval) |

| SCALE THRESHOLDS | | SPRAY ALLOWANCE |
|------------------|-------|-------------------------------------------|
| MONITORING | 4-20% | 1 application before next monitor result |
| | >20% | 2 applications before next monitor result |

During the monitoring period spray controls must be in response to pest levels meeting or exceeding monitoring thresholds.

PRODIGY RATE GUIDE:

| PRODUCT | PEST PRESSURE | RATE / 100 L | WATER RATE | RATE / HECTARE |
|---------|---------------|--------------|------------|----------------|
| PRODIGY | Moderate | 30 ml | 1000 L | 300 ml |
| | | 40 ml | | 400 ml |
| | Severe | 50 ml | | 500 ml |

Use the above table to determine prodigy use rates We have adjusted for 1000 L use which is recommended. The product label states 15-25 ml/100 L for use at 2000 L which is 300-500 ml/ha.

PYGANIC APPLICATION TIMING FOR THRIP CONTROL - JA ONLY

Greenhouse Thrips are a minor pest in terms of damage to kiwifruit but can create market access issues. If you are seeing higher than usual levels follow the Zespri recommendations below. Pyganic can be combined with an oil along with an adjuvant such as Wetcit, OroBoost or Du-wett. You will also need to contact Zespri Crop Protection before submitting your Spray Diary for final audit so this can be cleared.

| PYGANIC APPLICATION TIMING FOR THRIP CONTROL - JA ONLY | |
|--------------------------------------------------------|-----------------------------------------------------------------------------|
| | SPRAY ALLOWANCE |
| JAN/FEB | If higher than usual numbers detected |
| 18-21 DAYS PRE HARVEST | If higher than usual numbers detected — knockdown but not control |
| 2-3 DAYS PRE HARVEST | If higher than usual numbers detected — knockdown of any new generations |

If you have a neighbour with a different crop which is also affected by thrips discuss control options, so the pest can be effectively targeted at the correct time for both parties.

MAJOR CHANGES FROM LAST SEASON:

ROVRAL (IPRODIONE)

Removed from CPS, use not allowed.

TIMOREX GOLD

Included as a control option for sclerotinia.

FLOCK OFF

Included as a bird repellent option

STREPTOMYCIN

Maximum 1 application and only under JA

ADDITIONAL INFORMATION

ADDITIONAL SPRAYS: Growers concerned about their holistic orchard environment may like to consider spraying beneficial biological sprays regularly to replenish some of the beneficial non-target organisms that are also being affected by the copper and bactericide sprays. PyGanic may be needed to be vine sprayed if PVH reaches problematic levels. Additional foliar fertilisers may be used over summer to help with plant health such as during heavy crop loading or in programmes with high copper use.

FOLIAR FERTILISERS/SEAWEED: Product labels often advise first use from budbreak stage but the number of applications and when to cease use for the season is not always clear with different products. Caution is advised for use after fruitlet stage as it is uncertain whether the increase in vine health and growth is at the expense of fruit dry matter accumulation. The below table is a guide only; please seek advice from trusted advisors if you're unsure about timing and number of applications.

| FOLIAR APPLICATION STAGES | |
|---------------------------|-----------------------|
| 1 | Pre-flower |
| 2 | Pre-flower |
| 3 | Early fruit formation |
| 4 | 1-2 weeks later |
| Optional | 1-2 weeks later |

AGRICHEMICAL USE AND NOTIFICATION: Responsible use means the ongoing availability of products which assist in growing a successful crop. Communicate with your neighbours and work together to devise a satisfactory plan. We recommend requiring your spray contractor to use an automated notification system to protect you and the spray contractor against prosecution. Ensure contact details are up to date.

It's vital to comply with legislation. Notify neighbours within 50 m of your property when spraying (needs to be within 20 days to 12 hours before). Prominently

display signage to indicate spraying is taking place (signs must be in place no less than 24 hours before spraying). Many products have different use requirements – sprayer set up, weather conditions, compatibility etc. Be certain the applicator is fully aware of these and responding accordingly.

While only low levels of copper resistant Psa have been found it's always important to use agrichemicals correctly to avoid resistance occurring. Resistance can occur in disease, weeds and insects. Follow these guidelines:

1. Use full label rates (use of lower rates assists survival of resistant individuals that then start to dominate the population leading to control failure over time).
2. Ensure adequate coverage.
3. Alternate products with different modes of action

GENERAL/GUIDELINES: Some labels stipulate a rate per hectare, in these cases a rate per 100 L has been calculated to match the suggested water rate given here, please check the product label and recalculate the rate per 100 L if using water rates different from those listed in this programme, refer to the Zespri Spray Techbox for assistance <https://goo.gl/k48TI7>.

This isn't a list of every spray you could use, but a guideline. The complete list of products is updated each season in the Zespri Crop Protection Standard, and the allowed other compounds (AOC) list.

Cultural control is an important part of responsible orcharding and cultural control methods should be used as part of any complete integrated pest management (IPM) programme.

Any tank mixes suggested above (indicated by bold borders and shaded grey) are based on manufacturer compatibility information and feedback from spray diary information.

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