Australian Government

Australian Pesticides and Veterinary Medicines Authority

Chlorpyrifos proposed regulatory decision

Submissions received

March 2024

To whom it may concern

Dear Sir/Madam,

Thank you for providing the opportunity to comment on the Technical Report of the Draft Statement of Reasons for the proposed course of action for chlorpyrifos, (dated 12 December 2023). Although as a concerned member of the public, I welcome the revocation of many of the approved uses of chlorpyrifos, I am concerned with the robustness and transparency of the methodology of the environmental risk assessment. In this regard, the calculations of the risk of chlorpyrifos from run-off (see Appendix D pp 138-152) and risks to non-target species terrestrial vertebrates (pp 74) of the Technical Report of the Draft Statement of Reasons on chlorpyrifos and relevant APVMA publications is unfortunately inadequate. The following details the shortcomings of the report.

The report states that the run-off calculations were performed using PERAMA for the higher Tiers 2 and 3 and the final results correlate with those calculations [redacted]. However, the methodology to obtain those values is obscure as PERAMA uses the latest version of the Aquatic exposure estimates in "Australian Pesticide Environmental Assessments Runoff Risk Assessment Methodology" (APVMA 2020) for all Tiers, including decisions to whether a higher tiered assessment is required and not "Appendix B of the APVMA Risk Assessment Manual, Environment". To exacerbate this problem there are three versions of runoff methodologies presented in a confusing manner by the APVMA on their website, to the point where, the APVMA would appear that they are themselves confused to which method they are using. The APVMA then introduce an assumption "that no more than 50% of the catchment is treated at once". This is inconsistent with the remainder of the Technical Report, which assumes 100% of the field treated for the calculation of exposure to birds and mammals, for most cropping scenarios. Regardless of which methodology was used, the assumption that 50% of a 10 ha catchment is treated at once, does not appear in any of the three methodologies presented by the APVMA. Also, there appears to be little support for this assumption for broadacre crops such as cotton. According to Cotton Australia (2024), the average cotton farm has 576 ha sown to this crop. Although other crops and natural areas may intersperse areas sown to cotton, on a 10 ha scale, there is still a reasonable probability that all of it will be treated. This would be especially likely for the purpose of controlling insect pests where partial control would be particularly undesirable. This assumption could be a misinterpretation of the heterogeneity factor of 0.5 used in the APVMA methodologies, which is applied to recognise that <50% of an area effectively contributes to runoff on a catchment scale (based on Dunne and Black, 1970). However, as this heterogeneity factor is still applied, the APVMA's assumption results in halving the risk quotient (RQ) in the calculations. This assumption appears to be carried through all of the calculations, even in the higher tier assessments, yet somehow results in the same values as calculated by PERAMA, which does not make this assumption ([redacted]).

For "Risks to Non-target Species Terrestrial Vertebrates" (pp 74), the report states that "in light of new assessment methodology practiced since the previous assessment was published, risks to terrestrial vertebrates have been reconsidered since the previous chlorpyrifos assessment was published (2019)"; however, the methodology is unpublished or referenced. It does not appear to follow the published methodology Appendix A - Terrestrial Vertebrates (to the Risk Assessment Manual), which is in turn based on EFSA (2009), as the default value for this methodology for the fraction of diet obtained within the treatment area (PT) is 1. The new methodology assumes the PT value to be 0.5. Although the Risk Assessment Manual allows for refinement of the PT value, this can only be done where there is realistic data available. There does not appear to be any data or justification for assuming the PT value to be 0.5.

Given the confusing and inconsistent application of risk assessment methodologies and tenuous assumptions made in the Technical Report, I do not believe that the report fulfills the obligations and commitments of the APVMA to be science based and transparent, in its decision making. Accordingly, I recommend that the APVMA thoroughly review their calculations to determine the risk of chlorpyrifos to non-target terrestrial vertebrates and the aquatic environment, from run-off. In addition, for future assessment the APVMA review their communication of their methodologies.

Yours sincerely,

A concerned member of the public

References:

APVMA (2020) Aquatic exposure estimates in Australian pesticide environmental assessments Runoff risk assessment methodology April 2020, accessed https://www.apvma.gov.au/node/65936, 22 January 2024.

Cotton Australia (2024) Industry Overview, Accessed cottonaustralia.com.au/industry-overview 10 January 2024

Dunne T. & Black R.D. (1970) Partial Area Contributions to Storm Run-off in a Small New England Watershed, Water Resources Research 6(5): 1296-1311.

European Food Safety Authority; Guidance Document on Risk Assessment for Birds & Mammals, EFSA Journal 2009; 7(12):1438. doi:10.2903/j.efsa.2009.1438. Available online: www.efsa.europa.eu

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11 March 2024

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RE: Chlorpyrifos proposed regulatory decision

To the chemical review panel,

Thank you for the opportunity to comment on the proposed regulatory decision regarding chlorpyrifos.

The Australian Table Grape Association (ATGA) is the peak industry body representing Australian table grape producers and affiliates. In that capacity the ATGA would like to submit the following comments regarding the proposed review decisions for chlorpyrifos in the context of its use in Australian table grapes.

Overview of the table grape industry

The Australian table grape industry is made up of approximately 400 family run or corporate entities, producing 233,000 tonnes of table grapes in 2023[1], on 10,000 hectares across Australia's mainland states and the Northern Territory. The average size of table grape farms is 30 hectares.

The gross production value from Australian table grapes is significant and continues to rise – from $700 million in 2019 to $918 million in 2023[1]. This equates to 15% of the national production value of horticulture. The industry is very export focussed, with an export value of $557 Million in 2019 that stayed stable into 2023[1] despite the labour and export challenges of COVID-19.

[1] Hort innovation (2024) Australian Horticulture Statistics Handbook 2022/23. All Fruit – Overview. Report by Fresh Logic for Hort Innovation. https://www.horticulture.com.au/contentassets/a36fdfa2427d4ad284c426663b06f15c/hort-stats-fruit-22-23.pdf

Most exports come from Victoria, although producers in central Queensland and Western Australia commencing exports as well.

Chlorpyrifos within a table grape treatment program

Chlorpyrifos is seen as an important pest management option in table grape production. It can be applied for the management of Lightbrown apple moth or Grapevine moth as a foliar treatment at the rate of 50mL/100L (25 g ac/100L) or as a dormancy treatment, following pruning, at 100mL/100L (50 g ac/100L) or 50 mL/100L + 1L oil, as a directed spray in a narrow band to drench cordons and crowns to control overwintering scale.

It is mainly applied early season up until mid-November in volumes ranging from 250 L/ha for early season treatments progressing to 600-1000 L/ha as a full crop canopy develops.

Rationale for using chlorpyrifos

Chlorpyrifos is a favoured treatment for early season treatments because producers claim that:

- a single, early-season application achieves excellent control, thereby reducing the overall insecticide load in a vineyard;
- beneficial insects return relatively quickly after a single, early-season treatment;
- a single, early-season treatment that works well removes the risk of needing a series of later-season alternative insecticides, all of which carry a risk of detectable residues; and
- producers have experience, through residue testing, to estimate a suitable extended withholding periods to meet the various MRLs of export markets. The same information (extended WHPs for export) is not yet available for most of the newer, alternative chemistry.

Control failures associated with using alternatives to chlorpyrifos

Alternative insecticides treatments have led to control failures of sap-sucking insects. That in turn leads to an increase in the total number of insecticide treatments producers are applying, including later season remedial treatments, and therefore an increased risk of MRL breaches. Control failures associated with using alternatives to chlorpyrifos cannot be blamed on inexperience, or poor treatment timing. Treatments are applied on advice from chemical industry advisers, commercial agronomists, consultants and pest scouts. The industry is extremely well serviced by highly professional pest scouts and agronomists — exporting table grape producers must enlist commercial services of an accredited pest scout in order to register for export. Producers and their service providers give very high priority to maximising efficacy, minimising off- target impacts, and compliance with export and domestic MRLs, evidenced by the downloads and usage of the ATGA's MRL app and information about protecting beneficial insects. The ATGA proposes that producers are very aware of the implications for Integrated Pest Management and meeting MRLs of trading partners, and so the nature of chlorpyrifos usage within the industry can be managed such that it poses no greater risk to trade or beneficial insects or the IPM program than other registered insecticides.

[ATGA MRL app - Australian Table Grape Association (australiangrapes.com.au)](https://australiangrapes.com.au/mrls-app/)[2]

[Beneficial insects and the impact of some pesticides on grapes: at a glance - Australian Table Grape Association (australiangrapes.com.au)](https://australiangrapes.com.au/beneficial-insects-and-the-impact-of-some-pesticides-on-grapes-at-a-glance/)[3]

Occupational exposure

The ATGA believes the basis for the occupational exposure assessment is flawed. The default value of 30 ha overestimates the area that could be sprayed in a work day. In terms of the area that can be covered in a workday the ATGA offers the following.

i) The main types of equipment used in grape vine applications are either a two-row (industry standard) to three-row sprayers.

To treat 30 ha using a two-row sprayer applying 600 L/ha, using a 2000 L spray tank, would involve 11.2 hours travelling at 7 kph. Applying 1000 L/ha would take 13.7 hours.

A three-row sprayer would require 9.3 hours to apply 600 L/ha and 11.3 hours to apply 1000 L/ha.

The ATGA therefore proposes that the APVMA use a more realistic work day rate of 15 ha.

Operator exposure during mixing and spraying have been significantly reduced in the last decade by use of mixing hoppers and use of tractors with cabins with air filters.

Widespread adoption of hopper for mixing chemicals was initially to comply with requirements for OH&S under the produce certification schemes (GlobalG.A.P., FreshCare and HARPS etc). However, managers now value, in addition to the safety value from hoppers, a measurable improvement in efficiency of tank filling. Mixing hoppers have significantly reduced the risk of operator exposure during mixing.

Tractors with enclosed, filtered cabins are standard equipment across the table grape industry in all regions except the Swan Valley of Western Australia (where the linked trellis design is not suited to a tall tractor).

Trade

The ATGA acknowledges the potential for chlorpyrifos residues to disrupt trade, as highlighted in the PRD. In fact MRL disparities and the management of residues have been an ongoing and vey high priority issue, due to the export focus of the table grape industry.

Table grape producers are acutely aware that they must comply with export MRLs, and also aware of residue levels measured in their own crops. Producers have standing relationships with particular agents and markets, and are monitoring MRLs and treatment options all season, to ensure that residues will fall below MRLs for each market. Every consignment sent to export is accompanied by the results of a multi-residue test. The vigilance of producers was evidenced when Korea revoked their temporary MRL for

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[2] https://australiangrapes.com.au/mrls-app/

[3] https://australiangrapes.com.au/beneficial-insects-and-the-impact-of-some-pesticides-on-grapes-at-a-glance/

chlorpyrifos — Australian grapes were already in containers on ships, en-route. Those producers responded by turning consignments around and sending to alternative markets, simply to avoid the risk of chlorpyrifos detections in Korea.

The ATGA developed an MRL app[2] that provide producers and service providers with real-time information on maximum residue limits and withholding periods, for both domestic and export markets. The app has been available to industry stakeholders since 2019 and the ATGA monitors the numbers of app downloads and views.

The ATGA therefore believes that the industry has a history of effectively managing MRL disparities and is confident the situation will remain unchanged, i.e. use of chlorpyrifos is unlikely to have any adverse trade impact.

Environment

The assumed 21 days of unfettered feeding by wild mammals would not occur during the growing season. Regarding the potential dietary exposure of wild mammals, the ATGA offers the following insights.

The requirements associated with export phytosanitary protocols stipulate absence of quarantine pests, spiders, or any foreign plant material such as seeds. Because the majority of the table grape crop is produced for export it must comply with these protocols. Therefore, grasses and other plants in the inter-row are regularly mowed close to the ground, or managed with herbicides, not allowing plants to go to seed, and so reducing populations of birds feeding on grass seeds. Bird scarers during the day time act as effective deterrents, frightening and discouraging terrestrial vertebrates from entering vineyards during daylight hours. Netting on the vines also makes them unattractive to birds or kangaroos. Mowing the interrow also makes it less attractive to kangaroos.

A high proportion of table grapes are field picked by hand into boxes that are then placed on the ground to wait collection and transport to cool rooms. There is a zero tolerance for anything that compromises sanitary, phytosanitary or quality standards:

i) Maintenance of sanitation at every step is critical to ensure that the grapes meet food quality standards. Presence of feral animals in a vineyard is not acceptable.

Pickers need to move quickly and efficiently and safely through a vineyard. The vineyard floor is therefore flat without tripping hazards, and any burrowing by rabbit would be promptly removed.

Table grape growers are very pro-active to prevent any economic impact by animals feeding or active in a vineyard. If rabbits or hares are active in vineyards they chew through drip irrigation lines. In particular, a young vineyard is a very costly investment, and managers go to lengths to make the vineyard unattractive to hares and rabbits by placing the young vines in guards and being vigilant about animals causing damage to dripline. Rabbit proof fencing also restricts movement into the vineyard from native vegetation on the vineyard border.

The key point being that feeding does not occur unfettered and elicits an appropriate crop protection response. Consequently the assumption that wild mammals would obtain 50% of their food items from the treatment area for the first 21 days after treatment is flawed.

Risk quotient calculations presented in Table A2 of the Chlorpyrifos Review Technical Report

Further the ATGA questions the basis for the risk quotient calculations presented in Table A2 of the Chlorpyrifos Review Technical Report. Firstly, the ATGA is unaware of any approved use of chlorpyrifos as ground directed spray at a rate of 250 g ac/ha in grapevines. Secondly, the ATGA is unaware of any small herbivorous wild mammals that are likely to be encountered in vineyards comparable to the European Common vole, upon which the generic focal species is based. As indicated larger herbivores can be problematic and should form the basis of any such environmental risk assessment.

Thirdly, the exposure rates listed for differing crop growth stages do not reflect industry practice, i.e., that 250 g ac/ha is applied in a water volume of 1000 L/ha at all crop growth stages including BBCH 10-19 or 20-39. As indicated above water volumes used early in the crop cycle correspond to the amount of leaf canopy, e.g., 250 L/ha early, the exposure rate used in determining the risk quotient should therefore be amended. Added to this the assumption that 50% of a wild herbivorous mammals diet would come from within the treated area is further unlikely given current agronomic practices in the management of inter-row vegetation.

In summary, the ATGA suggest that the APVMA revise the risk assessments in the review relating to the use of chlorpyrifos in vineyards, based on the information provided.

Thank you for inviting public comment.

Yours sincerely,

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11 March 2024

Chlorpyrifos – Preliminary Regulatory Decisions

The Grains Research and Development Corporation (GRDC) appreciates the opportunity to provide this response to the APVMA's Proposed regulatory decisions for the insecticide chlorpyrifos.

GRDC leads investment in grains research, development and extension (RD&E) on behalf of 25 levy paying industries in Australia. From that perspective GRDC wishes to flag a number of concerns and provide specific comments in relation to certain parameters used in the risk assessments relating to worker safety, trade and the environment.

Of particular concern to GRDC is the lack of effective alternative insecticides for the control of broadacre crop establishment pests when applied as either pre-plant or early post-emergent, against soil residing arthropod pests including Blue oat mite (*Penthaleus spp.)*, the Lucerne flea (*Sminthurus viridis*) and the Red-legged earth mite (*Halotydeus destructor*). The inability to control these pests represents a significant threat to the Australian canola industry, with an estimated 2023 production value of 6.457 billion Australian dollars.

Worker safety

Regarding the APVMA ***not being satisfied*** *that use of chlorpyrifos, would not be, an undue hazard to the safety of people exposed to it during its handling or people using anything containing its residues.*

The APVMA has used 600 ha as the work day area treated in determining the exposure risk for chlorpyrifos[4]. GRDC questions the basis for this value. Groundboom spraying in broadacre, unless specified differently, involves between 70-100 L/ha. At an application volume of 70 L/ha, to spray 600 ha would require 42,000 L of spray mixture. If the boom is 16 m wide and using medium nozzles[5], the output per minute would around 55 L/minute[6]. To spray 42,000 L would require over 12 hours. When refills and the time involved in ferrying are considered the likelihood of treating 600 ha in a work day can be seen as impractical. GRDC believes a work rate of 250 ha a work day of 7 hours provides a more accurate and realistic figure.

Using 250 ha/day and applying a water volume of 70 L/ha, the calculated time involved would be decreased to 5.3 hours, but without considering time involved in ferrying, turns, mixing and loading. Applying 70 L/ha to treat 250 ha would require between 4 and 6 loads, depending upon spray tank capacity. Consequently, when mixing and loading is counted, e.g., 20-30 minutes/load, 250 ha/day is considered to be more representative of current practice.

As a result GRDC believes that the APVMA should refine the worker exposure risk assessment to reflect the more realistic work day scenario of a maximum of 250 ha per day, and suggests that assessments at lower application rates approved for use against Blue oat mite and Red legged earth mite, e.g., 35 g ac/ha and 70 g ac/ha, would address any concerns from the perspective of potentially unacceptable margins of exposure.

GRDC also wish to highlight that the priority pests for which for chlorpyrifos is primarily used is in the management of the soil residing pests the Blue oat mite (*Penthaleus spp.)*, the Lucerne flea (*Sminthurus viridis*) and the Red-legged earth mite (*Halotydeus destructor*), i.e., at rates of 35 g ac/ha and 70 g ac/ha.

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[4] Chlorpyrifos Review Technical Report
[5] ASABE Medium VMD range 236-340 microns
[6] TeeJet XR8004 or 06 nozzles on 50 cm spacing with an output of 1.7-1.9 L/minute/nozzle at 250-300 kpa

Trade

*That the APVMA is **not satisfied** that use of chlorpyrifos "for major export commodities, does not, or would not, unduly prejudice trade or commerce between Australia and places outside Australia.",* i.e., that *"trade risks can be adequately mitigated for any uses"*

In the PRD and the Review Technical Report it is concluded that use in broadacre crops cannot be supported, with the exception of applications made to cereals, canola and pulses prior to crop emergence. As highlighted above the priority uses for chlorpyrifos is either pre-plant or early post-emergent, against soil residing arthropod pests, i.e., when detectable residues in harvested commodities are unlikely. As a result it is believed the use of chlorpyrifos against these pests would not pose a risk to trade.

Environment

*The APVMA is **not satisfied** that use of chlorpyrifos, would not be, an undue hazard to non-target organisms and is not, or would not be, likely to have an unintended effect that is harmful to animals, plants or things or to the environment*

Given the priority uses for chlorpyrifos in broadacre cropping are to soil and prior to or during early crop establishment, GRDC has concerns over the basis for the estimated risks to terrestrial vertebrates. In particular, that "*50% of food items are obtained from the treatment area for the first 21 days after the last application*" given the lack of foliage this level of dietary exposure seems highly unlikely. From that perspective the use of a seasonal exposure rate, for foliage in oilseeds of 454 g/ha, to calculate the daily dietary dose in deriving the risk quotient for wild mammals is believed questionable and significantly overestimates potential exposure.

GRDC also has concerns over the regulatory acceptable level (RAL) of 1 mg/kg bw/day applied in assessing long-term risks to wild mammals. The 1 mg/kg bw/d was based on developmental effects in offspring, i.e., decreased body-weight gain and survival of F1 pups at the 0 and 5 mg/kg bw/d dose levels (Breslin 1991). However, this effect was, in part, attributed to lack of feeding due to maternal neglect. Whereas Breslin also proposed a reproductive NOEL of 5 mg/kg bw/d level, the highest dose tested and a potentially more relevant threshold from a chronic exposure perspective and use as the RAL in assessing chronic exposure.

GRDC has further concerns over the estimated soil half-life used in the chlorpyrifos risk assessments. It is understood that variable soil half-lives have been reported for chlorpyrifos in the scientific literature which have be attributed to a range of factors such as the climate, soil biological and chemical properties, as well as the concentration of the applied chlorpyrifos, with higher initial concentrations resulting in differing dissipation curves and extended half-lives[7] [8]. As the initial concentrations used in the studies cited in Table 25, are not reported, the basis for the estimated summary DT_{50} value is unclear. Further with regards to soil chemistry, it is understood that chlorpyrifos is less persistent in soils with a higher pH[9]; and shows a reduced half-life in planted soil as compared to non-planted soil[10]. GRDC suggests that the APVMA should consider the use of half-lives that reflect the likely circumstances associated with the use of chlorpyrifos, rather than rely on a single default value.

Regards

Gordon Cumming
Manager Chemical Regulation

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7 Racke, K. 1993. Environmental Fate of Chlorpyrifos. Reviews of Environmental Contamination and Toxicology, Vol. 131.
8 Murray et al. 2001. Stability of chlorpyrifos for termiticidal control in six Australian soils. J Agric. Food Chem. 49(6):2844-7
9 US EPA Reregistration Eligibility Science Chapter for Chlorpyrifos Fate and Environmental Risk Assessment Chapter; 1999.
10 Yadav, R & Khare, P. 2023. Journal of Hazardous Materials Vol 448.

CHLORPYRIFOS SUBMISSION

BACKGROUND.

This is a submission on behalf of the Busselton Zone of the Potato Growers Association of Western Australia. Growers in this area have come to rely heavily on Chlorpyrifos used as per MUP PER80344. We are subject to considerable (Sometimes extreme) pressure from soil insects in this area mainly African Black Beetle. (ABB) Chlorpyrifos is used strategically to counter incursion of this pest from surrounding areas (eg pasture). Prior to the advent of Chlorpyrifos, potato growing had become untenable for most in this region due to widespread resistance to the then currently available chemicals.

We are currently unaware of any other product registered for this use in our situation. Removal will probably have a very serious effect on our industry due to the very low tolerances in the marketplace for insect damage.
Most growers (See contact list) in this area would be forced to give up growing potatoes if access to Chlorpyrifos was denied. (This applies both to ware and seed production) See attached photos of affected areas in a current crop.

The industry is also under extreme cost of production pressures currently.

THE FUTURE

We would like to see the current Minor Use Permit extended until such time as a suitable alternative can be found. Growers are aware that Chlorpyrifos is under pressure to be removed from most uses, but we feel that due to the strategic nature, and small-scale use in this area an extension for a period of time to allow appropriate screening trials of possible alternatives would be appropriate.

It should be recognised that residue testing of potatoes from this area has never shown any cause for concern. (We can provide relevant test results if required) Operator exposure is minimal due to nature of our useage patterns. We could also provide details of current
practices in this area if required.


I am a consulting agronomist working in the Lockhart area of Southern NSW. Please consider carefully the ongoing access to Chlorpyrifos and co-formulations such as Pyrinex Super insecticide. I have used it for bare earth activity on Lucerne Flea & RLEM in establishing Canola, pastures & some pulses. To my knowledge there are no alternative registrations for other products that give adequate Lucerne Flea activity. We do use insecticide seed dressings where possible but these are inadequate in higher pressure situations. If preventative measures aren't taken, crop loss often occurs prior to a reactive Early Post emergent insecticide application. My view is maintaining registrations for establishing Canola and pastures particularly is very important for the co-formulation of Pyrinex Super for Lucerne Flea and RLEM and to a lesser extent for chlorpyrifos activity on wireworm.

Thank you.

12 March 2024

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Re: Chlorpyrifos – Preliminary Regulatory Decisions

AUSVEG welcomes this opportunity to comment on the December 2023 Chlorpyrifos Proposed regulatory decisions (PRD). AUSVEG, as the industry body representing the vegetable production sector, and has consulted industries potentially affected by the proposed regulatory decisions contained within the Chlorpyrifos PRD. This has resulted in concerns being raised over a number of recommended regulatory actions.

AUSVEG is aware that APVMA have received submissions from other grower bodies flagging concerns over the recommended regulator actions. It of critical importance to consider the following when making regulatory decisions for our industry:

- There is very low tolerance from retailers for any pest occurrence in produce supplied. Entire shipments get rejected if the threshold is crossed.
- Chlorpyrifos is primarily used early season in vegetables against soil residing pests such as the Redlegged earth mite or Cutworm
- There is no alternate product or minor use permit available for application in vegetables and potatoes which will significantly impact the ability of growers to supply produce to the Australian consumer

Critically, AUSVEG's has concerns over the default values used in the worker safety and environmental risk assessments as well as conclusions drawn in relation to trade and residues which is driving the APVMAs regulatory action. AUSVEG wishes to bring these concerns to the attention of the APVMA and propose alternative approaches for consideration. Outlined in this submission are specific comments to address certain proposed regulatory decisions.

Warm regards,

Zarmeen Hassan

National Manager, Biosecurity and Extension

Introduction to AUSVEG

AUSVEG is the national peak industry body representing the interests of Australian vegetable, potato and onion growers, an industry valued at $5.5 billion contributing to food and job security in the Australian economy. We are committed to securing the industry's future.

We advocate for growers, to all levels of government and ensure that the industry has a strong, active voice in the public sphere. We also communicate industry issues and perspectives to government, media and the public.

AUSVEG is the service provider for a number of grower levy-funded research and development projects that Horticulture Innovation Australia and Plant Health Australia manage.

Ensuring the results from these projects are made available to Australian vegetable, potato and onion growers is vital for the industries to remain at the forefront of global horticulture production and for local growers to operate an efficient, productive and profitable growing operation.

As mentioned, AUSVEG has significant regarding the material findings of fact and reasons for the proposed decisions as outlined in the Statement of Reasons and we offer the following responses.

Worker safety

Regarding the APVMA ***not being satisfied*** *that use of chlorpyrifos, would not be, an undue hazard to the safety of people exposed to it during its handling or people using anything containing its residues.*

The APVMA has used 50 ha as the area treated in a work day in determining the exposure risk for chlorpyrifos[1]. AUSVEG questions the basis for this value. Water volumes used when spraying vegetable crops are generally between 500 and 1000 L/ha, and AUSVEG believes an upper limit work rate of 20 ha/day is more realistic for insecticide and fungicide spraying in vegetables. It should also be noted that where the spray application occurs in conjunction with planting operations, the area treated would be substantially lower due to the reduced speed particularly, when such applications involve banded spraying.

For example, chlorpyrifos labels indicate a rate of 1000 L/ha when applying the insecticide for the management of cutworm in vegetables[2]. At 50 ha, this would involve applying 50,000 L of water in a day. If an 8 m spray boom[3] is used applying a medium spray pattern[4] it would take between 26 and 30 hours to spray 50 ha. If the same configuration were used with a 16 m boom, it would still take in excess of 13 hours to spray 50 ha. Additionally, both estimates neglect the time involved in ferrying, end of row turns, mixing and loading. The pursuit of a finer droplet spectrum would not manifestly alter the time required to treat 50 ha, but require using significantly higher pressures with an increased risk of drift.

Using 20 ha/day and applying a water volume of 1000 L/ha, the calculated time involved would be decreased to 5.4 hours, but without considering ferrying, turns, mixing and loading. Lowering water volumes/ha would decrease the time involved in spraying a hectare but when mixing and loading is considered, e.g., 20-30 minutes/load, an upper limit of 20 ha/day is considered realistic.

Consequently, AUSVEG believes that the APVMA should refine the worker exposure risk assessment to reflect a more realistic work day scenario of a maximum 20 ha per day, and suggests that assessing a range of lower application rates approved for use in vegetables, e.g., 400 g ac/ha for vegetable weevil, 350 g ac/ha for cutworm, 250 g ac/ha for wingless

[1] Chlorpyrifos Review Technical Report
[2] Of note is that a number of chlorpyrifos labels carry an erroneous water rate of 100 L/ha for applications against cutworm
[3] 16 TeeJet XR8004 or 06 nozzles on 50 cm spacing with an output of 1.7-1.9 L/minute/nozzle at 250-300 kpa
[4] ASABE Medium VMD range 236-340 microns

grasshopper and 150 g ai/ha for Redlegged earth mite, would be of value from the perspective of estimating potential margins of exposure.

Residues

The APVMA is ***not satisfied*** *that the use of chlorpyrifos … meets the safety criteria*

In the PRD and the Review Technical Report it is concluded that use in vegetables cannot be supported. This outcome was arrived at for certain commodities due to insufficient residue trial data as well as more broadly across all food-producing situations, due in part, to worker health and safety risks. Regarding the latter aspect AUSVEG considers it appropriate that the APVMA reconsider this decision, in the light of information provided above regarding work rates.

In terms of the specific vegetable commodities identified where there was insufficient information to assess the level of chlorpyrifos in the harvested commodities, AUSVEG asks if the nature of the specific data deficiencies could be clarified. Were the current conclusions the result of a re-evaluation of the previously submitted trial data, or carried over from 2009[5]?

In the PRD it is indicated that the use on chard (silver beet) and cucumbers could not be supported due to possible exceedances of the ARfD. However, the basis for this conclusion is unclear. In Chard (silverbeet) chlorpyrifos is approved for the management of the soil pests Redlegged earth mite and Blue oat mite and would be applied early in the crop cycle with an MRL of 0.01 mg/kg. Or does the potential exceedance relate to the general Vegetables rate range of 250-350 g ac/ha and uncertainty over resultant residues?

The cucumber residue trial data reported by the APVMA in 2009 indicates that at a WHP (with holding period) of 7 days, the short-term dietary exposure would be acceptable. AUSVEG believes that the APVMA has been overly conservative and suggests that a WHP of 7 days or longer would mitigate any potential short-term dietary exposure risk. Regarding other cucurbits AUSVEG suggests that the data provided for cucumber should be sufficient to satisfy the APVMA that the results could be extrapolated to zucchini (summer squash), while acknowledging the lack of suitable data to support post-planting foliar uses on other cucurbits.

For Brassica vegetables, the APVMA indicated in 2009 that the legacy registrant supported planting or pre-planting uses and that as a result no WHP was required when used as directed. From a residues and dietary exposure perspective does the APVMA concur with that proposition?

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5 Preliminary review findings report on additional residues data Chlorpyrifos

Regarding the use of chlorpyrifos treated insect baits, it is recognized their use may pose potential risks when applied in bare earth or at planting situations. However, AUSVEG believes its use in established crops would pose a significant lower risk, i.e., at advanced growth stages, such as BBCH 60 and above, where the crop canopy would effectively act to screen the baits from birds and small vertebrates.

Trade

*That the APVMA is **not satisfied** that use of chlorpyrifos "for major export commodities, does not, or would not, unduly prejudice trade or commerce between Australia and places outside Australia.",* i.e., that *"trade risks can be adequately mitigated for any uses"*

According to APVMA residue guidelines, no vegetable commodities are indicated in Residue requirements Part 5B "*Overseas trade aspects of residues in food commodities*", and as such are not considered significantly traded commodities of which residue violations, if they were to occur, would be considered likely to prejudice Australia's trade.

AUSVEG acknowledges that MRLs have been and are being withdrawn in a number of jurisdictions. However, as the majority of Australian vegetable production is consumed domestically the risk to trade is seen as minimal. The majority of vegetable exports occur from three commodities, carrots, onions and potatoes. AUSVEG believes that any potential trade risks associated with the use of chlorpyrifos can be mitigate through reference to residue trial data reported by the JMPR in 2000[6], i.e., at planting or via extended WHPs.

Environment

*The APVMA is **not satisfied** that use of chlorpyrifos, would not be, an undue hazard to non-target organisms and is not, or would not be, likely to have an unintended effect that is harmful to animals, plants or things or to the environment*

Regarding the unacceptable risk to terrestrial vertebrates AUSVEG has concerns over the basis for the calculated risk to mammals derived in the dietary exposure and food chain assessment scenarios. These concerns relate, in part, to the estimation of the seasonal exposure rate and the long-term risks. In the Review Technical Report it is indicated that the seasonal exposure rates in vegetables are 259 g ac/ha (band application) and 454 g ac/ha in leafy vegetables. It is unclear how these values were derived given a DT_{50} for foliage was indicated at 4 days[7], i.e., residue decline appears to have been disregarded. Applying a DT_{50}

6 Pesticide residues in food – 2000 evaluations. Part I. Residues. FAO Plant Production and Protection Paper, 165, 2001.

7 Table A1 Chlorpyrifos Review Technical Report

of 4 days would result in a seasonal exposure rate in the order of approximately 80 g ac/ha, 7 days after the second application.

Further concerns relate to the basis upon which the long-term risk estimates and reported risk quotients for wild mammals are estimated. These seem to be theoretical rather than reflective of potential use and risk scenarios. For example, AUSVEG is unaware of any small native herbivorous mammals likely to frequent vegetable production areas in Australia. With regard to small omnivores an assumption that the diet consists of 25% weeds and 50% weed seeds[8] in Australian vegetable production is not realistic given use of cultivation and herbicides, or is the assessment assuming a crop can be grazed unrestricted for 21 days by large herbivores?

AUSVEG also seeks clarification over the determination the chronic NOEL value of 1.0 mg/kg bw/d, used as the basis for a regulatory acceptable level. The value used by the APVMA, based on the Breslin (1991) study, related to developmental effects in rat offspring, i.e., decreased body-weight gain and survival of F1 pups in the 0 treatment and the 5 mg/kg bw/d. This effect was, in part, attributed to maternal neglect. Whereas Breslin also proposed a reproductive NOEL of 5 mg/kg bw/d level, the highest dose tested and a potentially a more relevant threshold from a chronic exposure perspective.

Regarding the use of 97 mg/kg bw as the acute LD_{50} it is unclear is why this value has been applied as a default to all wild mammals. The 1999 JMPR reported a range of LD_{50} values for rats (Henck & Kociba) as well as for guinea-pigs and rabbits (Lackenby 1985)[9]. AUSVEG therefore seeks to understand why the value of 97 mg/kg bw was chosen as representative value for all wild mammals, given the interspecies variation reported, i.e., LD_{50} values of 504 mg/kg bw and 1000-2000 mg/kg bw for guinea-pigs and rabbits, respectively. Consequently, AUSVEG questions whether an LD_{50} of 1000 mg/kg bw may be a more appropriate and representative value for use in large terrestrial vertebrates risk assessments.

Chlorpyrifos is primarily used early season in vegetables against soil residing pests such as the Redlegged earth mite or Cutworm. As the amount of foliage available will be limited AUSVEG has difficulty in reconciling the estimated maximum seasonal exposure rates listed in Table A1[10] given the foliar interception fraction applied elsewhere in the Report, i.e., 0 for soil application and 0.25. Consequently AUSVEG believes the seasonal exposure rate results in a significant overestimate for small and large herbivorous mammals.

As indicated above the primary application of chlorpyrifos in vegetables is early season, either at, prior to planting, or against early season crop pests. Consequently, the proposition that a herbivore is able to obtain 50% of their food items from the treatment area for the

[8] EFSA 2009. Guidance Risk assessment for birds and mammals

[9] Pesticide residues in food – 1999 evaluations. Part II. Toxicological. World Health Organization, WHO/PCS/00.4, Geneva, 2000

[10] Table A1 Chlorpyrifos Review Technical Report

first 21 days after the last application seems unlikely. Further it is unclear why the threshold of 21 days has been applied, as it is not believed to be representative of any mammal's life span.

AUSVEG also has concerns over the geomean estimated soil half-life used in the chlorpyrifos risk assessments. In the Chlorpyrifos Review Technical Report a number of studies were cited upon which the DT_{50} value was apparently based[11]. It is understood that variable half-lives have been reported for chlorpyrifos in soil in the scientific literature which can be attributed to a range of factors such as the climate, soil biological and chemical properties, as well as the concentration of the applied chlorpyrifos, with higher initial concentrations resulting in appreciably longer dissipation rates[12] [13]. As the initial concentrations used in the studies cited in Table 25, are not reported, the basis for the estimated summary DT_{50} value is unclear. Further with regards to soil chemistry, it is understood that chlorpyrifos is less persistent in soils with a higher pH[14]; and shows a reduced half-life in planted soil as compared to non-planted soil[15]. AUSVEG suggests that the APVMA should consider the use of half-lives that reflect the likely circumstances associated with the use of chlorpyrifos, rather than rely on a single value.

Consequently, AUSVEG suggests a more appropriate geomean estimation could be to calculate a range DT_{50} values based on the initial concentrations reported in the literature, e.g., up to 500 g ac/ha, up to 1000 g ac/ha and above 1000 g ac/ha, rather than relying on a single geomean value for soil half-life.

Runoff assessment risk

AUSVEG has concerns over the fraction of the catchment treated used and its importance in assessing potential environmental exposures, i.e., assuming 50%, overstates the risk that can be attributed to any one crop. It is suggested the area involved in the production of individual crops grown in any catchment should be considered using the MCAS-S tool to provide a better indication of the potential contribution from the use of chlorpyrifos in a crop to the estimates of environmental exposure.

Conclusion and Recommendation

For the reasons outlined above AUSVEG believes that the risk characterisation and resultant proposed regulatory decisions have overestimated the level of risk posed by some of the uses of chlorpyrifos. AUSVEG therefore suggests that the APVMA should further refine

11 Table 25 Chlorpyrifos Review Technical Report
12 Racke, K. 1993. Environmental Fate of Chlorpyrifos. Reviews of Environmental Contamination and Toxicology, Vol. 131.
13 Murray *et al*. 2001. Stability of chlorpyrifos for termiticidal control in six Australian soils. J Agric. Food Chem. 49(6):2844-7
14 US EPA Reregistration Eligibility Science Chapter for Chlorpyrifos Fate and Environmental Risk Assessment Chapter; 1999.
15 Yadav, R & Khare, P. 2023. Journal of Hazardous Materials Vol 448.

elements of its risk assessment and give consideration to alternative risk management options. In particular, industry believes that the APVMA should reconsider the proposed lack of support for use in a number of vegetable crops as the estimations are not reflective of practise at farm level.

1 Yadav, R & Khare, P. 2023. Journal of Hazardous Materials Vol 448.

04 March, 2024

Chemical Review

APVMA

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RE: Proposed review decisions - Chlorpyrifos

Avocados Australia Limited (AAL) welcomes this opportunity to comment on the December 2023 Chlorpyrifos Proposed Review Decisions and the Review Technical Report. AAL is the national peak body representing avocado growers. In that capacity AAL has sought industry feedback on the use of chlorpyrifos and provides the following relating to the proposed regulatory decisions relating to worker and environmental safety and trade.

To begin with chlorpyrifos is seen as a valued tool in the management of a number of foliar Lepidopteran pests, scale insects and the red shouldered leaf beetle.

In terms of the applications against foliar pests, the APVMA indicate the use is not supported due to an assessment outcome over safety (environment and worker exposure). The worker safety assessment appears to be based, in part, on a spray scenario involving the spraying of 30 ha in a work day. While orchard densities can vary from 200 trees/ha (10m x 5m) to 500 trees/ha (6m x 3m spacings)[1], the most common is a medium density of around 250 trees/ha (8m x 5m)[2.] If using a 2000 litre spray tank coupled with a refill time of 20-30 minutes at a tractor speed of 4 kph an estimated 1.4 ha could be treated in an hour or 9.8 ha/day (7 hours). However, in large canopies spraying at over 4 kph would be unlikely to result in sufficient canopy air displacement; increased variation in spray deposition which would lead to substandard results, i.e., slower speeds would be required further reducing the area that could be treated[3 4]. Therefore, to achieve the assumed work rate of 30 ha/day, either significantly

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1 https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/crops/fruit-veg/avocado/plant

2 Avocado growing NSW Agfact H6.1.1

3 Drew, 2004. Sprayer setup to suit your needs and orchard. Final report, Project no.MC03002. Horticulture Australia Ltd, Sydney, Australia

higher tractor speeds, sacrificing spray efficiency, or a work day in excess of 20 hours would be required. As a result AAL believes the current assumed work rate is a significant over estimate, and suggests that the APVMA consider applying a more realistic 10 ha/work day.

'Higher' work rates are potentially possible if bait spraying occurs for Queensland fruit fly. The area covered is likely to be 15 to 20 ha/day due to the applications involving a directed continuous coarse spray to one side of every row or to both sides of every second row[5]. They predominantly involve the use of booms, with nozzles directed at spraying the lower 10-15% of the tree foliage (skirt), avoiding contact with fruit. Given the nature of the application regime AAL believes the fraction of the field treated variable of 0.4 significantly overstates the proportion of the crop canopy that is treated, as well the dietary exposure for frugivores given fruit are harvested hard green.

Consequently, the basis for the proposed worker safety regulatory decisions is unclear. This is coupled with apparent inconsistency in the rates reportedly used in completing the bait spraying assessments. In the Review Technical Report, 500 g ac/ha is listed as the application rate in Tables 24 and A1 list, as does the Footnote to Table 34. Table 28 indicates a rate of 250 g ac/ha, while Table 40 indicates the amount of active actually approved for use as a bait spray as 30-60 g ac/ha. The basis for these differing rates is uncertain. As a result it is unclear which rate was used by the APVMA's in assessing bait spraying to conclude the use could not be supported due to worker exposure concerns.

AAL also believes greater clarity is also needed with regards to other parameters used in the environmental assessments. In terms of the food chain assessments, Table B1 indicates a generic foliar interception fraction of 0.6; presumably to cover deposition on potential herbivore feed items under the tree canopy. However, AAL believes further refinement is required to differentiate between deciduous and evergreen crops, i.e., crop growth stage is less likely to affect spray interception in the latter. From that perspective it is suggested that the

[5] Bock and Hotchkiss. 2021 Effect of tractor speed and spray application volume on spray coverage. Plant Disease. Vol 105, No,9

[5] Protein bait spraying NSW DPI Fact sheet 2023

APVMA consider using the citrus interception factor 0.8[6], as an alternative, in the absence of a specific avocado interception value.

Related to the above AAL also questions the specific generic focal species used in the dietary exposure assessments, listed in Table A2, particularly the assessments relating to small native herbivorous mammals of which do not frequent avocado orchards[7].

With regards to large herbivores the values used relate to foraging activity occurring at ground level[8], i.e., not necessarily reflective of possible arboreal vertebrate feeding. While feeding on avocado foliage can occur. Feeding on fruit is limited as they are harvested as hard green, e.g., ICA-30, and as with other pests' growers take action to mitigate impacts of such feeding. This coupled with uncertainty over the assumption that 50% of an animal's food items are obtained from the treatment area for the first 21 days after the last application, AAL believes the environmental assessment outcomes have overstated the potential risks of use. Further, the relevance of 21 day timeframe is unclear given the resultant daily dietary dose levels reported in Table A2 appear to be zero day estimates.

AAL also has concerns over the basis for food chain assessment scenarios and the 50% of the catchment treated from the perspective of avocado spraying. MCAS-S data has been used in relation to some uses but it is unclear why it has not been deployed more broadly. As a result AAL believes that attributing 50% of catchment treatment to avocados, as a default, is a significant overestimate, as the area planted to avocados nationally is estimated at only 19,000 ha[9], spread across eight growing regions. As a result AAL believes the seasonal catchment exposure rate should be revised.

Finally, regarding the potential risks to trade the industry has been actively managing MRL differences for a number of years through the provision of MRL information to growers. Most recently the industry launched a web-based application providing information on MRLs for key

[6] EFSA 2014 EFSA Journal 12(5):3662

[7] AAL understand that there are few small native herbivores e.g., Greater Stick-nest Rat, *Leporillus conditor*, the Broad-toothed Rat, *Mastacomys fuscus*, and the Swamp Rat, *Rattus lutreolus*) whose distribution do no overlap with avocado production regions

[8] EFSA 2009

[9] Australian Horticulture Statistics Handbook 2022/23 https://www.horticulture.com.au/contentassets/a36fdfa2427d4ad284c426663b06f15c/hort-stats-fruit-22-23.pdf

export destinations. Consequently, the industry believes that given its history of effective residue management, any risks from the use of chlorpyrifos can be successfully managed.

In summary, AAL would appreciate consideration of the APVMA of the points raised prior to the finalisation of the review.

Yours sincerely,

John Tyas, CEO

gene ethics
working for a GM-free future

March 11, 2024

Chemical Review
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Re: GeneEthics comments on the Chlorpyrifos Review

Introduction

GeneEthics urges the APVMA to mount a strong evidence-based case for a total ban on all uses of chlorpyrifos in Australia and globally. Australia is well-placed to encourage and participate in the emerging global processes leading towards a total world-wide chlorpyrifos ban.

Expert panel decisions and recommendations will be brought to the Stockholm Convention's Persistent Organic Pollutants (POPs) Conference of Parties in 2025, to list chlorpyrifos under the Convention. This would enforce a global ban on the persistent organic pollutant.

Corteva (Dow/Dupont) was the main supplier of chlorpyrifos in Australia with various registered products, all of which it recently cancelled. This shows the global agrichemical industry is well aware of the strong trend towards Australian and global chlorpyrifos bans and is acceding to them.

This is a prime opportunity for the APVMA to re-establish its independence, objectivity and credibility as a public interest regulator. Our agrichemical regulator cannot continue be a captive and servant of the corporate interests of the global agrichemical industry that CropLife Australia[1] and others represent in 91 countries.

The case for a global ban with the APVMA in the lead

APVMA's support for this proposed policy change would align with the recommendations of key UN chemical experts, gathered under the Stockholm Convention's Persistent Organic Pollutants (POPs) Review Committee, backing global action to ban chlorpyrifos. They concluded the chemical causes unacceptable adverse human health and environmental effects. Experts from 31 countries also agreed that chlorpyrifos meets the criteria for listing under the Rotterdam Convention, who also support a global ban.

Appendix E of the APVMA's own Tech Review Report provides the detail, to which the APVMA could respond with support for national and global bans. Instead it merely notes "Chlorpyrifos met the screening criteria specified in Annex D of the Stockholm Convention on Persistent Organic Pollutants." Crucial criteria confirm chlorpyrifos hazards are:

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[1] CropLife Australia, Members. https://www.croplife.org.au/about/our-members/

- Persistence: it remains in the environment for long periods without breaking down;
- Bioaccumulation: accumulates in living organisms and increases in concentration up food chains;
- Long-range Environmental Transport: It is transported over long distances from its release site, often in air and water, adversely affecting regions far from its places of origin;
- Adverse Effects: It is both confirmed and predicted to have significant negative impacts on human health and/or the environment.

Chlorpyrifos is an endocrine-disrupting[2] [3] and organophosphate pesticide that has all these negative characteristics.

The Toxicity Criterion of App E in the review's Tech Report confirms:

> "Several epidemiological studies and reviews from regulatory authorities have associated pre- and postnatal exposure to chlorpyrifos with changes in brain morphology, delays in cognitive and motor functions, problems with attention and tremors. This, in addition to high toxicity to mammals, indicates a potential for damage to human health. Chlorpyrifos shows a high toxicity to aquatic organisms at approximately 0.1 µg/L. Invertebrates, especially crustaceans and insects, are the most sensitive taxa among aquatic organisms. Chlorpyrifos shows high acute toxicity to terrestrial vertebrates, especially to birds (LD50 value of 13.3 mg/kg bw) and to non-target arthropods, especially pollinators. The very high acute and chronic toxicity to a wide range of vertebrates, invertebrates and insects (including bees) indicates a potential for damage to the environment."

Such conclusions are the accumulation of a strong body of scientific evidence for over 30 years that show the chemical should have been banned long ago. There are no grounds for further delay.

The current Australian standard also allows the product to consist of chlorpyrifos, together with a 3 g/kg maximum for the "toxicologically significant manufacturing impurity O,O,O',O'-tetraethyl dithiopyrophosphate (S,S-TEPP)" recognised since at least 2003.[4] The APVMA cavalierly claims these are "acceptable levels of toxicological impurities." It's akin to Monsanto excusing its supply of dioxin-contaminated Agent Orange, dropped on Vietnam in the 1960s and '70s. Gross newborn deformities still occur in the families of Vietnamese and veterans who were exposed then.[5]

As of 2022, chlorpyrifos is banned in at least 40 countries globally, based on the evidence of its high toxicity and its adverse effects on neurodevelopment, especially prenatal exposure. Together with those others, Australia would be well-placed to facilitate a global ban.

Despite the APVMA's belated 2019 decision to restrict garden and domestic use in Australia, residues in food remain a cause for concern. The US EPA ended the use of chlorpyrifos on food crops in August 2021.

In its trade risk assessment for export commodities, the APVMA's misplaced concerns are reflected in Table 21 on page 61 of the Technical Report. It compares proposed Australian and

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[2] Endocrine disrupting chemicals. https://www.endocrine.org/-/media/endocrine/files/advocacy/edc-report2024finalcompressed.pdf
[3] Gore, A.C., La Merrill, M.A., Patisaul, H.B., and Sargis, R. Endocrine Disrupting Chemicals: Threats to Human Health. The Endocrine Society and IPEN. February 2024.
[4] Ambrus, A, et al. Significance of impurities in the safety evaluation of crop protection products (IUPAC Technical Report), Pure Appl. Chem., Vol. 75, No. 7, pp. 937–973, 2003. https://www.degruyter.com/document/doi/10.1351/pac200375070937/html
[5] Nwanaji-Enwerem JC, Jenkins TG, Colicino E, Cardenas A, Baccarelli AA, Boyer EW. Serum dioxin levels and sperm DNA methylation age: Findings in Vietnam war veterans exposed to Agent Orange. Reprod Toxicol. 2020 Sep;96:27-35. doi: 10.1016/j.reprotox.2020.06.004. Epub 2020 Jun 6. PMID: 32522586. https://pubmed.ncbi.nlm.nih.gov/32522586/ and following references.

current international chlorpyrifos Maximum Residue Levels (MRLs) for chlorpyrifos residues in animal products entering the human food supply.

For example, APVMA proposes a four-fold increase in the MRL for chlorpyrifos residues in the fat of mammalian meat, from 0.5 mg/kg to 2 mg/kg. This will be 20 times the EU's MRL of 0.01, 4 times Japan's MRL of 0.05, and double the Korean MRL of 1. The international Codex Standard and the European Union have revoked their MRLs on safety grounds so have zero tolerance for measurable chlorpyrifos residues in meat imported to the EU.

In 2019, the European Food Safety Authority (EFSA) concluded that chlorpyrifos-methyl didn't meet human health criteria for re-registration, so a total EU-wide ban on both chlorpyrifos-methyl and chlorpyrifos-ethyl began. It was upheld in the European Court of Justice, in October 2023.

Yet the APVMA's Tech Review attention to the impacts of child exposures is cursory:

- Though "uncontrolled risks to children associated with re-entry into treated areas," was a factor in all home garden and domestic uses of chlorpyrifos being cancelled;
- No precautions are proposed as "the risks to children from newly planted lawns using recently sprayed (with chlorpyrifos) commercial turf were acceptable";
- Safety directions on chlorpyrifos-treated veterinary ear tags for animals merely says: "Do not allow children to play with tags"; and
- Chlorpyrifos impregnated plastic film widely used as banana bags during growing season, has a safety direction: "Do not allow children to play with bags".

The stance of other major international agencies on the toxicity of chlorpyrifos also reinforces our case for Australia to have a total domestic ban and to contribute strong support to a global ban. These include:

- The World Health Organization (WHO) that has chlorpyrifos in its Guidelines for Drinking-water Quality (GDWQ), based on comprehensive reviews; and
- The Food and Agriculture Organization (FAO) has acted against the use of chlorpyrifos on food crops, including soy products, due to health concerns.

Unfortunately, GeneEthics has scant confidence that the APVMA will act fearlessly and in the public interest on chlorpyrifos. Several chemicals now widely banned or restricted overseas, including chlorpyrifos, have been on the APVMA's priority review list since 1995.

The Clayton Utz report[6] to Agriculture Minister Murray Watt, on APVMA documentation: "found instances where the APVMA's approach appears focused on assisting industry," that "appears to be embedded into the APVMA's regulatory priorities and culture." Further, "Of the 10 ongoing chemical reviews eight have been in progress for over 15 years or more, with seven ongoing for nearly 20 years." The APVMA's action to review chlorpyrifos is helpful, though belated, and its proposed use restrictions and product label amendments are mere window-dressing.

The APVMA must apply the Precautionary Principle and impose the burden of proof for safety and efficacy on the agrochemical industry which enjoys a free ride for its interests under present review processes. The Chemicals Reassessment and Reregistration Scheme that was cancelled in 2014 should be re-enacted to serve the public interest and to ensure that all toxics are regularly reviewed, with responsibility resting on the chemical companies.

Conclusion

GeneEthics asks the APVMA to immediately mount a strong evidence-based case for a total ban on all uses of chlorpyrifos in Australia and globally.

[6] Clayton Utz, APVMA Strategic Review Report - July 2023

7th February 2024

Chemical Review
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SUMMERFRUIT AUSTRALIA Ltd: Response to the Chlorpyrifos PRD

Summerfruit Australia (SAL) is the peak body representing Australian stone fruit growers. Through our industry network, growers have been contacted seeking feedback on the proposed regulatory actions following the review of chlorpyrifos.

From an industry perspective chlorpyrifos is still seen as a valuable insecticide particularly in the management of San Jose scale. An insect identified as a high priority pest through industry surveys, for which there are few alternative management options[1].
In reviewing the basis of the concerns outlined by the APVMA and whether chlorpyrifos meets the safety criteria with regards to worker, trade and environmental risk, SAL provides the following commentary.

Worker health and safety

Regarding the statement that the APVMA was not satisfied that the instructions for use of chlorpyrifos chemical products would not pose an undue hazard to the safety of people exposed to it, during its handling. due to potential exceedance of the margins of exposure[2].

SAL suggests that the values used in assessing the risk over a workday, i.e., 30 ha, is an overestimate. Applications of chlorpyrifos in Summerfruit for San Jose scale are made primarily as pre or early season treatments, often mixed with winter oil. Applications generally involve spraying with 1000-1500 L/ha. Higher water volumes are not required due to the timing, i.e., early stage of tree growth.
When applying 1500 L/ha with a spray tank capacity of 2,000 litres, with the time involved in mixing, loading and end of row turns are included, a tree crop applicator could spray approximately 1.4 ha/hour travelling at 5 kph. This would amount to 21.4 hours to spray 30 ha[3]. Use of greater capacity spray tanks would reduce the number of refills. Nevertheless, a grower could spray 2.0–3.0 ha on a single tank increasing the equivalent time of 120 to 130 minutes per tank load when mixing/loading/spraying and travel times are included, i.e., the maximum daily area treated would be of the order of 10 ha. Industry feedback indicates that depending on terrain and orchard block size it is likely that the areas treated would, in fact, be appreciably lower.

That 30 ha is an overestimate is further highlighted when orchard architecture and the processes involved in spraying an orchard are considered. Traditional standard density for stonefruit trees are

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[1] https://www.horticulture.com.au/contentassets/284ae27ba06443f698f66bc0165a0578/summerfruit-sarp-2020-final.pdf

[2] (27)f) II and 29) a) Appendix A APVMA Gazette no 25.

[3] D Manktelow 2014. Spraying apples: Sprayers and sprayer performance

440 trees per hectare (6.5 × 3.4 m) with standard layout high-density trees at 600 trees per hectare (5.2 × 3.2 m), i.e., 5-6 m tree row spacings[4].

Using a simple calculation, based on a 5 m row spacing, a sprayer travelling at 4 kph in a continuous straight line could spray one hectare in 30 minutes. To spray 30 ha would take 15 hours with no turns, refills, mixing or loading. If the speed were increased to an unlikely 10 kph, one hectare could be sprayed in 12 minutes, with 30 ha taking six hours with no turns, refilling, mixing or loading. Given both scenarios would require a spray tank holding 45,000 L of water it can be seen that basis the risk assessment on a 30-ha workday is impractical. In addition, increasing travel speed has the disadvantage of reducing coverage[5] [6].

Therefore, the maximum amount of active constituent that could be handled per day would be in the order of 5-7.5 kg ac/day, (50 g ac/100 L in 1000-1500 L/ha). Appreciably less than the value upon which the APVMA assessment was based. Consequently, SAL asks that the APVMA reassess the worker exposure assessment utilizing a maximum daily work rate, as outline above of 10 ha/day.

Residues and trade

Fresh Summerfruit is a traded commodity, with 14.3% of national production exported in 2019[7] (2023 figures show similar percentages). By commodity, the percentage of each crop exported is shown in the table below. SAL acknowledges that on the basis of the MRLs listed[8] compliance could be problematic resulting in risks to international trade.

	Export volume (t)	National production (t)	% exported
Apricots	561	9027	6.2
Nectarines/Peaches	15,645	119,775	13.1
Plums	6,839	32,241	21.2

However, chlorpyrifos is principally relied upon for the management of San Jose scale with applications occurring during dormancy or very early season. SAL therefore agrees with the APVMA's observation that following applications during dormancy, finite residues are not expected in harvested fruit, and therefore the risk to trade can be considered low. SAL also believes that the use pattern currently used for San Jose scale would also address stated insufficient information to assess the level of residues flagged in sections 27) f) III and 28) c), regarding foliar use on peaches.

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[4] https://www.dpi.nsw.gov.au/agriculture/horticulture/citrus/content/crop-management/orchard-management-factsheets/high-density-planting-and-pruning-case-study-sunmar-orchards,-sunraysia

[5] Travis, *et al*. 1987. Effects of travel speed, application volume, and nozzle arrangement on deposition of pesticides in apple trees**.** Plant Dis. 71:606-612.

[6] Salyani & Whitney. 1990. Ground speed effect on spray deposition inside citrus trees ASAE Vol 33(2)

[7] Australian Horticulture Statistics Handbook 2018/19

[8] Chlorpyrifos Review Technical Report - 231212

Environment

The APVMA indicated that it was not satisfied that the use of chlorpyrifos would not be likely to have unintended effects harmful to non-target species, i.e., that they may be exposed to unacceptable chlorpyrifos levels[9]. Firstly, SAL has concerns over how the estimated rate of

degradation for chlorpyrifos was established. In the Chlorpyrifos Review Technical Report a geomean, with regards to field dissipation, of DT_{50} 28 days was indicated. It is understood that the breakdown of chlorpyrifos in soil is biphasic and can be influenced by a number of factors, in addition to organic matter content, such as the initial rate of application, i.e., significantly longer at higher concentrations when compared to lower concentrations[10] [11]; soil pH, i.e., is less persistent in soils with a higher pH[12]; and situation, i.e., reduced soil half-life in planted soil than non-planted soil[13]. As a result, SAL questions the reliance on a single geomean value for soil half-life, given that concentrations in soil following applications can differ significantly depending on the crop and situation, affecting the dissipation of chlorpyrifos and potential environmental risks.

Secondly, SAL also appreciates that to initiate an environmental risk assessment certain assumptions relating usage needed to be made. However, it has concerns over how the seasonal catchment exposure values were determined. SAL questions why the MCAS-S data has not been used determine a more accurate estimate of the catchment fraction treated, as the use of 50% and 20% of a catchment being treated in determining risk overstates the potential levels of environmental exposure. Consequently, SAL believes that the risk assessments need to be further refined, for example to consider other factors such as types of land use and temporal variations in use.

Considering individual crops grown in a catchment would provide a more accurate indication of likely impacts. For example, for the Murray Valley region the ABS indicates that the total area mainly used for crops was 973,994 ha[14]. Of that Orchard fruit and nuts (excluding grapes) are 9,538 ha, less than 10% of the estimated cropping area and less than 0.1% of the region. While it is acknowledged that the ABS regions don't necessarily align with catchment areas it highlights the fact that tree and nut crops in their entirety make up a small proportion of the region.

The potential for overestimation can be further seen in the context of land use mapping completed for the Riverina area[15]. In the Figure below it can be seen that the area involved in perennial crop production, of the listed tree and vine crops, is small when compared to annual cropping areas, forestry and other uses, which include built-up areas, water bodies and grasslands, i.e., pasture.

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[9] APVMA Gazette 25 section 27) f) V
[10] Racke, K. 1993. Environmental Fate of Chlorpyrifos. Reviews of Environmental Contamination and Toxicology, Vol. 131.
[11] Murray et al. 2001. Stability of chlorpyrifos for termiticidal control in six Australian soils. J Agric. Food Chem. 49(6):2844-7
[12] US EPA Reregistration Eligibility Science Chapter for Chlorpyrifos Fate and Environmental Risk Assessment Chapter; 1999.
[13] Yadav, R & Khare, P. 2023. Journal of Hazardous Materials Vol 448.
[14] Australian Bureau of Statistics Agricultural Commodities, Australia 2019-20
[15] Brinkhoff, J et al.2020 Remote Sens. 12, 96; doi:10.3390/rs12010096

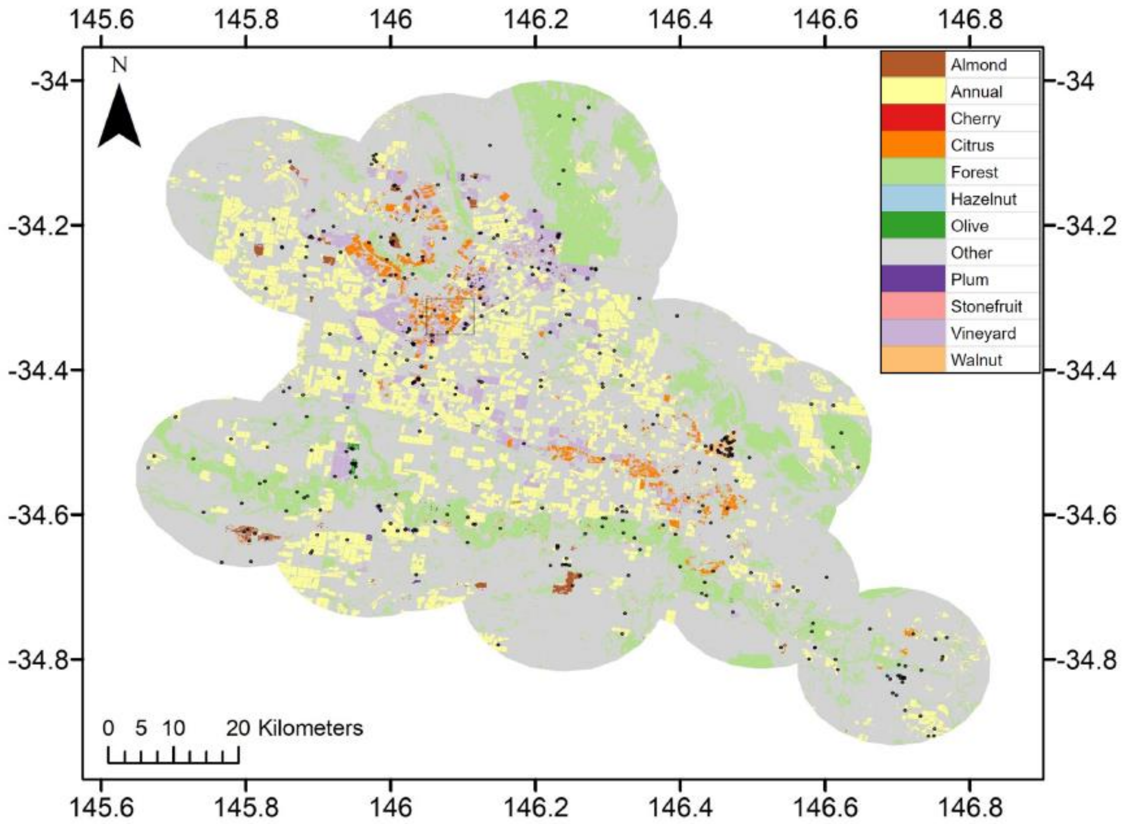

Figure 1 Riverina area classified by land use through remote sensing.

SAL therefore believes that refining the assessment to account for possible sources, proportionally, of chlorpyrifos, the APVMA will be able to complete its risk assessments on the basis of the potential contribution from different forms of agriculture where chlorpyrifos is likely to be used.

Conclusion

Summerfruit Australia, on behalf of the industry it represents, would strongly urge that the APVMA take into account the concerns raised and seek to refine its worker and environmental assessments to provide a more accurate indication of potential risk.

Yours faithfully,

Trevor M Ranford B.Sc., Dip MP (AIMSA), Adv Dip Hosp (Wine Marketing), AFIML
Chief Executive Officer
Summerfruit Australia Ltd

To:

Chemical Review
Australian Pesticides and Veterinary Medicines Authority
GPO Box 3262
Sydney NSW 2001
Via email: chemicalreview@apvma.gov.au

Date: 13 February 2024

To whom it may concern

I write in response to Australian Pesticides and Veterinary Medicines Authority (APVMA) proposal to make regulatory decisions in relation to the reconsideration of chlorpyrifos active constituent approvals, product registrations, and label approvals being conducted under Part 2, Division 4 of the Agricultural and Veterinary Chemicals Code scheduled to the Agricultural and Veterinary Chemicals Code Act 1994 (Agvet Code).

This submission is presented on behalf of the National Working Party on Grain Protection (NWPGP) and deals with chlorpyrifos and grain commodities as they relate to market access only.

1. The NWPGP:

- Is the industry body responsible for providing management and leadership to industry in the areas of post-harvest storage, chemical use, market requirements and chemical regulations.
- Is facilitated by Grain Trade Australia and the Chair is funded by Grains Australia.
- Has members across the entire grain supply chain.
- Hosts an annual conference providing participants with the latest research and developments, in the area of post-harvest storage and hygiene, chemical usage and outturn tolerances, international and domestic market requirements, and regulations.
- Co-ordinates and provides government with industry views on chemicals in use on grain and associated products.
- For further details, refer to http://www.graintrade.org.au/nwpgp

2. Industry Support for the Proposed Decisions

Based on the information in the notice provided for consultation in December 2023, industry does not object to the proposed course of action by the APVMA.

In reaching this decision, in summary, industry makes the following comments:

a) Industry supports the APVMA proposal to cancel many active constituent approvals, chemical product registrations and associated label approvals for uses on cereals, pulses and oilseeds in Australia given current and potential future market access concerns.
b) While the APVMA decision is based on various concerns such as the impact on the environment, WH&S, and trade, to name a few in varying instances of use, the main industry concern is the lack of suitable maximum residue limits (MRLs) in several key overseas markets. This generally includes the review at Codex and several markets recently reviewing and decreasing their MRLs and expected changes in other markets during the proposed phase-out period.
c) While there are some MRL issues (i.e., lacking, lower than Australia) in some markets, the industry has been able to manage exports and supplies to markets in compliance with those MRLs. This will become more difficult in future as more markets are expected to make changes to chlorpyrifos.
d) Industry supports the phase-out period and expects that the MRLs for registered uses not supported by the APVMA chemical review will be deleted after the completion of any phase-out period. Industry would not support an "extended period" for retention of Australian MRLs.
e) To re-iterate, industry noted this APVMA decision is for chlorpyrifos only, and does not relate to chlorpyrifos-methyl for which no changes are proposed in the current review.

Should you have any questions on this submission please do not hesitate to contact me.

Regards

Gerard McMullen

Chair
National Working Party on Grain Protection

Produced through Grains Australia Limited funding of this activity

Australian Banana Growers

Dear Sir/Madam,

Submission regarding the use of chlorpyrifos for the Banana Industry.

On behalf of the banana industry, the Australian Banana Growers' Council (ABGC) welcomes the opportunity to provide comment on the 2023 Chlorpyrifos Proposed Review Decision and The Review Technical Report. Chlorpyrifos is widely used by the banana industry being one of the most efficacious and cost-effective actives available for control of **bunch pests (Banana rust thrips, banana scab moth, Sugarcane bud moth, mealy bugs, caterpillars) under label approvals and under PER14240**. Additionally, it also known to provides some suppression of mite populations.

1. Importance to the banana Industry

The Australian banana industry is Australia's single biggest horticulture industry contributing around $1.3b annually to the economy and over 10,000 full-time equivalent jobs. Industry data for **2022/23** found that more than **374,251 tonnes** of bananas were produced with an estimated farm gate value of about **$600 million**. There are three main banana growing regions which includes far north Queensland (NQ), northern New South Wales (NSW) and Carnarvon in Western Australia (WA). **Ninety-four percent of the total production occurs in NQ. The national industry supplies 100% of Australia's domestic banana demand.**

Bunch pests are considered a major production constraint by industry and have been listed as high priority pests in the 2024 Banana Strategic Agrichemical Review Process (SARP). Bunch pests are active all year round in NQ and attack the developing banana inflorescence (bell) as it emerges from the center of the pseudostem. The insects feed on developing fruit which has a significant impact on fruit quality and in severe cases, can render the fruit unmarketable causing costly rejections. Banana growers have relied on chlorpyrifos as an essential part of bunch pest control since the withdrawal of omethoate in 2018, when options for bunch pest control have become limited.

The use of chlorpyrifos across the national industry is widespread for controlling bunch pests. In the main growing area of NQ, more than **99% of chlorpyrifos sold to the banana industry**, is for bunch pest control. **In that region, 95%** of growers apply chlorpyrifos to the bunch either by bunch spraying or by bunch dusting. In NSW, the use of chlorpyrifos to control bunch pests is also common practice.

2. How chlorpyrifos is used in the banana industry

ABGC believes that many of usage patterns used in the technical report are not relevant to today's banana farming.

Aerial application- (scab moth) has rarely been used since the 1980s when IPM compatible practices were adopted - such as the bell injection of chemicals was implemented to assist in controlling bunch pests. Nowadays aerial application of chlorpyrifos is unheard of.

Airblast/ broadcast (scab moth) to a plantation is never used – this is another legacy usage pattern from the past.

Bunch application (Banana rust thrips, banana scab moth, Sugarcane bud moth, mealy bugs, caterpillars). As mentioned above, the current and most frequently used application method is bunch spraying or bunch dusting. This application method is targeted and contained under the bunch cover as follows.

> Currently, common farm practice is to inject the developing bell at bell-emergence with acephate or spinetoram then treat developing bunches at bagging (1-2 weeks later) **with chlorpyrifos spray or dust.**
>
> The bunch cover (or bag) is put on over the bunch and Chlorpyrifos spray <u>or</u> Chlorpyrifos dust is applied up under the cover to the developing bunch with a wand. (the spray is applied to runoff – approx. 40-60 mL depending on bunch size). Prepared dust mix is applied with low pressure air gun so as not to damage the fruit. Often, other jobs are done by the user while applying the bunch covers, such as attaching support string to the bunch and/or inserting clip sheets (small sheets of plastic) between each hand of bananas within the bunch, to stop the fingers from rubbing on each other. If these other jobs are done while bagging and bunch treatment with chlorpyrifos, the work rate is almost halved.
>
> Sometimes a follow-up spray into the bunch is required but this is not commonplace.

Impregnated bunch covers – historically these were used by some of the industry, but they are currently unavailable in Australia and therefore not used.

Band Spray (banana weevil borer) – Though this is a targeted application (applied as a narrow band to the lower 30 cm of the plant and a 30cm wide around the base of the plant) **growers in NQ and the NSW industry do <u>not</u> use chlorpyrifos for control of banana weevil borer. Relying on other control options.**

Additionally, the Chlorpyrifos750WG formulation has not been available for many years.

3. <u>Workrates and application rates</u>

ABGC believes that the work-rates and application rates of 30 ha/day and 250 g ai/ha used in the technical report to assess worker safety are gross overestimations of what is being used in current banana farming practices.

The following information and details, shown below in Table 1, relating to current practices will hopefully inform more accurate risk assessments by the APVMA.

In NQ where 94% of the banana industry is located and the majority of chlorpyrifos is used:

- The average number of banana plants/ hectare is approximately 1550.
- Each plant has 1.1-1.2 bunches per/plant/ year depending on whether it is a plant crop or ratoon, and the location. In cooler areas like the Atherton Tablelands the cycle time is more like 1.1 bunches/plant/ per year. In NSW the average is one bunch/plant/year.

Table 1 Activities and work rates for bunch pest applications to banana plantations.

Activity	Formulation	Pest	Work rate: In an 7h day, the average No. of bunches one person could treat.	Total applied per day/person
Bunch spray or bunch dust + bunch covering.	500WP	Bunch Pests	300-400 bunches **Spray:** is applied to the bunch to runoff which depends on the size of the bunch but varies from about 40-60 mL. 10 g ai is mixed with 5 L water = 0.002 g/mL OR **Dusting:** 2-5 g prepared mix is applied per bunch (which contains 0.04g- 0.1g ai/bunch)	12-24 L spray 24 g ai – 48 g ai / person/day or For dust 12g-40 g ai/person/day
Bunch spray or bunch dust + bunch covering + clip sheets /other jobs	500WP	Bunch Pests	150-200 bunches **Spray** as above 40-60 mL /bunch. OR **Dust** 2-5 g prepared mix is applied per bunch (0.04g- 0.1g ai/bunch)	6-12 L spray 12-24 g ai/person/day Or For dust 6g-20g ai/person/day
Bunch spray only, as a follow up spray. (not often required)	500WP	Bunch Pests	500 40-60 mL per bunch Mix 10 g/5 L water = 0.002 g/mL	20L – 30L 40g – 60 g ai/person/day

(Note The 500EC formulation, though registered for bunch application is not favoured as it has been reported to cause fruit burn therefore growers prefer to use the 500WP for bunch application).

Typical examples of equipment used for **bunch spraying**:

- Hydrostatic tractor spray tank with hand gun, low pressure 60 psi, low volume with a 12 v pump.
- A 70L tank mounted on the bagging machine with a silvan diaphragm with a spray wand attached.

A typical example of equipment used for **bunch dusting**: A 20 L cylinder attached to a sandblasting gun venturi system (with pressure turned right down so as not to damage the fruit).

In summary, the usage patterns, work rates and application rates quoted in the technical report are not an accurate reflection of the use of chlorpyrifos in the banana industry and therefore we believe the work, health and safety risks to the user and the environment have been overstated.

4. Conclusion

Chlorpyrifos is an important chemical used widely by the banana industry for targeted control of bunch pests. The options for banana growers are becoming increasingly limited as actives come under review and are lost to industry. Chlorpyrifos is considered to be an effective chemical, easy to use and less hazardous to workers and the environment, and it is important to retain its use to help manage pest populations and prevent build-up of resistance.

We thank-you for your consideration as chlorpyrifos withdrawal from use would have a significant impact in the banana industry. Should you have any questions please don't hesitate to contact me.

Yours sincerely,

Dr Rosie Godwin

R&D Manager