29th October 2024

Australian Melon Association Inc
Email: ceo@melonsaustralia.org.au

ABN 36 990 325 012

Phone: 0407 032 023

Working together to build a successful future for the Australian Melon Industry

Chemical Review
Australian Pesticides and Veterinary Medicines Authority
GPO BOX 3262
Sydney NSW 2001

Via: chemicalreview@apvma.gov.au

To whom it may concern,

Melons Australia welcomes the opportunity to provide a submission on the proposed regulatory decisions for the reconsideration of paraquat and diquat, which were published in the APVMA Special Gazette, 30 July 2024[1].

Melons Australia is the Peak Industry Body for the Australian melon industry, including Australian growers of watermelons and muskmelons (rockmelons, honeydews and other specialty melon varieties). Production occurs across all mainland States and in the Northern Territory, from approximately 140 growers, producing on average 220,000 tonnes of fresh melons per year.

We acknowledge that the Australian Pesticides and Veterinary Medicines Authority (APVMA) plays an extremely important role as Australia's independent, science-based, national regulator of agricultural chemicals and veterinary medicines (agvet chemicals), ensuring chemicals sold in Australia are safe and effective however we wish to flag concern over the APVMA's proposed regulatory decision on paraquat and diquat 'APVMA Special Gazette, 30 July 2024'.

Melon growers are situated in many horticultural production areas around Australia from Kununurra in the far North of Western Australia down to Waroona, South of Perth, and Lakeland in Far North Queensland down to Shepparton in Victoria (and many regions in between) which means there are a myriad of different growing conditions that our growers contend with. In determining the usage patterns of the two chemicals in question and the importance to our industry we received feedback from approximately 20% of Australia's melon growers which represents approximately 80% of melon production across Australia – all of them use this chemistry in their crop management processes.

[1] Special Gazette, 30 July 2024 | Australian Pesticides and Veterinary Medicines Authority (apvma.gov.au)

In your consideration of this submission we stress that growers need support to ensure they remain sustainable in securing our nation's food security. To do so they require access to specific and cost-effective chemistry ensuring they can continue to provide the safest and most cost beneficial produce for Australian consumers.

How Paraquat and Diquat are currently used in the Australian Melon Industry:

Every grower engaged uses paraquat or a paraquat/diquat formulation as part of their weed management strategy, and this varied from application either every year or every 2 years depending on the season and weather conditions. There are two specific usage patterns for the Australian melon industry with this chemistry:

1. As a broad-spectrum herbicide spray during the fallow period or pre plant (generally using a boomspray), and
2. As an interrow shielded spray two to three weeks after planting seeds or transplanting seedlings and before flowering. This specific practice is used to target and control young weeds before they set seed. There is no contact with any fruit destined for human consumption.

The reasons that these chemicals are crucial to melon farming operations are numerous but include:

- Lack of alternatives for the purpose of use, noting that paraquat and diquat are contact, non-residual herbicides designed to knockdown weeds, whereas alternative systemic herbicides are not safe to use once the crop has been planted as any spray drift can kill the crop.
- There are no alternative herbicides that have the short plant back period they have allowing a block to be sprayed and then the crop planted within several days.
- They are needed for use in rotation with broad spectrum herbicides such as glyphosate for resistance management purposes.
- During wet weather especially, this chemistry is vital as mechanical (cultivation, hand chipping) is not an effective control measure.

Impact that loss of access will have:

- Higher food safety risk due to increased weed pressure attracting animals.
- Higher biosecurity risk as a result of increased weeds available to attract and harbour pests and diseases.
- Higher weed pressure resulting in higher harvest costs and much lower yields - estimated 20% reduction in yield potential. Therefore, for reference an 80 tonne/hectare crop at a return of $1.30/kg would experience roughly a 16 tonne/hectare loss due to weed pressure and competition, which would result in a loss of $20,800 per hectare should this chemistry be unavailable.
- Higher weed management costs in the form of increased labour for chipping.
    - Once the crop is planted systemic herbicides such as glyphosate can't be used, therefore this leaves manual cultivation (chipping) as the only alternative option for weed management.
    - One grower noted "without the effective use of paraquat there may be the requirement for extra employees to manually undertake the process of 'chipping' to deliver at least 4 passes per year costing approximately $3,500/ha. We cannot just absorb this, it would ruin many businesses".

    - This is based on the following calculation: on a farm with 300m rows (noting this is shorter than the norm for a melon farm, but the calculation remains the same across different row lengths) and 2m wide beds there are 12 rows per hectare including tractor rows. It takes a chipper approximately one hour to chip one side of the row ie. 24 hours per hectare @ $36/hour (including Super + workers compensation) = $3,500/ha.
- Most importantly the area that growers would be able to farm would have to reduce as it would be too costly and difficult to manage weeds, weather and plant back periods should access to paraquat and diquat chemistries be removed/reduced or heavily restricted.

There is unanimous concern from Australian melon growers that loss of these chemicals will have a drastic impact on their farming operations and their economic viability. With some indicating that this proposal, when considered alongside other regulatory changes, will result in a cumulative impact that will see them walk away from farming due to the inability to remain viable.

Our growers appreciate that these poisonous chemicals, when not used correctly, can be dangerous, however if the label instructions are followed and appropriate handling measures implemented the risk to human and animal life in commercial farming practices can be minimised as low as possible. It is interesting to note that melon growers who are based in all mainland States and the Northen Territory, across a broad range of regional areas, have noticed no reduction in the level of native bird or mammalian life through their field-based management practices (while using paraquat and diquat actives). This is something closely managed by melon growers due to it being a key component of their food safety risk management practices.

Melons Australia's concerns with the APVMA Technical Reports and the 'APVMA Special Gazette, 30 July 2024':

- Applicability of the European Food Safety Authority (EFSA) framework to Australian wildlife.
- Requirement for cucurbit specific residue data for diquat.
- APVMA's lack of understanding about farming methods and the potential impact of assumptions made within the report.
- Lack of consideration of anything but environmental and human health impact, with no cost benefit analysis of such a decision – and complete oversight of the significant cost impost to industry.

Applicability of European Food Safety Authority (EFSA) Framework to Australian wildlife:

We are concerned that the APVMA report is based on bird and mammalian studies that are not representative of Australian wildlife, their feeding habits and/or their diets. It is our understanding that the APVMA report used the EFSA framework on risk assessment for birds & mammals. The APVMA review established regulatory acceptable levels (RALs) for birds and mammals with the assessment focussing on acute risks to these organisms. The EFSA framework considers bird and mammalian species that do not necessarily reflect the diets of Australian birds and mammals that the APVMA assume are impacted by using the chemistry under review.

The recent report by the Australian Environmental Agency (AEA), prepared for the Grains Research and Development Corporation in response to the APVMA Technical Reports, clearly demonstrates that paraquat and diquat have significantly lower toxicity when consumed through diet rather than as an acute dosage.

*"Doses in the acute oral toxicity studies are administered as one large dose. In the field, most **birds continuously feed throughout the day** (Moore et al, 2014). The USEPA has historically required a sub-acute dietary study with chicks to evaluate this more realistic exposure route. The existing guideline for the sub-acute dietary study includes five days of continuous exposure to chicks via treated diet, followed by a three-day observation period with untreated diet.*

*When pesticides are **mixed with food**, or when consumed at a time when the gastro-intestinal (GI) tract has other food items present, they are **absorbed less efficiently** than when dosed as a bolus in pure form into an empty GI tract"* (Lehman-McKeeman, 2008).

If the APVMA review is upheld in its current form, then we recognise that for Australian melon growers the use of paraquat will be supported during fallow periods up to 231 g ac/ha per season (Table 29, APVMA 2024[2]), however its use as an interrow spray will not be supported at the minimum rate required (as per the label) of 300g ac/ha. Given the direct acute consumption vs dietary toxicity results of the various research reviews, industry strongly support the evidence being reviewed with Regulatory Acceptable Levels (RALs) calculated to allow a maximum application rate amended to 427g ac/ha, which would allow for the current label rate to be upheld for seedling weeds which allows for between 300g and 400g ac/ha for use as an interrow spray. This would recognise that the toxicity to birds and mammals is much lower when/if feeding in a dietary manner over a number of days rather than direct ingestion of a full dose with no other food in their stomach, as per Table 35 below from AEA, 2024.

As outlined in the report prepared by the AEA, and in line with the data used by the APVMA in making this proposed decision, melons and other cucurbit vegetables fit within the category of "bare soil" production according to the EFSA crop groups identified in their framework document (EFSA, 2009[3]).

"The APVMA has weed control activities as largely occurring at the early growth stages of crops (or in fallow) and fall under a 'bare soil' scenario. This will include full disturbance and fallow/minimum disturbance uses." (AEA, 2024).

Table 35: Bare soil maximum supported rates, (BBCH <10), EFSA (2009)

Generic model species	Shortcut value	APVMA RAL		Refined RAL	
		Risk quotient[1]	Maximum rate (g/ha)	Risk quotient[1]	Maximum rate (g/ha)
Birds					
Small granivorous, finch	24.7	4.3	**231**[2]	0.94	1069
Small omnivorous, lark	17.4	3.1	328	0.66	1517
Small insectivorous, wagtail	10.9	1.9	523	0.41	2422
Mammals					
Small omnivorous, mouse	14.3	2.344	427[3]		

1) Risk quotient based on application rate of 1000 g ac/ha
2) Maximum accepted rate identified by APVMA
3) Refined maximum accepted rate

[2] https://www.apvma.gov.au/sites/default/files/2024-07/Paraquat%20Review%20Technical%20Report%202024.pdf
[3] https://www.efsa.europa.eu/sites/default/files/engage/171106.pdf

The AEA report goes on to consider application via optical spot spraying. While melon growers are not commonly using this technology, we would argue that the same principles must apply to interrow spraying for knocking down weeds at early emergence.

EFSA (2023)[4] states categorically that restricted treatment areas such as spot spraying are a specific mitigation measure which can be used in a quantitative risk assessment for birds and mammals. In this regard, the guidance states:

> *"Restricted treatment areas are a clear way to reduce the risks to birds and mammals. However, to be able to account for it in a risk assessment there must be a clear indication of the size of area to be treated".*

When interrow spraying occurs on a melon farm the latest application time would be well before the flowering stage of weeds. This is governed by the absolute requirement to reduce weed pressure through spraying no later than when the melon vine reaches the edge of the bed (to protect the melon plant from being sprayed) which is no later than 3 weeks after planting. In a melon production timeline, this is well before the weed plant produces seeds and therefore exposure by any of the feeding guilds, as identified for bare soil scenarios (See Table 15 – AEA, 2024) is only expected to come from seed being consumed from previous crops or weed seeds that have dropped from the previous season and not from weed seed from the weeds being sprayed.

Table 15: Bare fallow feeding guilds, diet items and contributions to diet (BBCH <10) (EFSA 2009 Bird and mammal Tier1 tables)

Feeding guild	Generic focal species	Diet composition	Body weight (g)
BIRDS			
Small granivorous	Finch	100% weed seeds (ground)	15.3
Small omnivorous	Lark	50% seeds (ground) 50% ground arthropods	28.5
Small insectivorous	Wagtail	100% soil invertebrates (ground)	17.6
MAMMALS			
Small omnivorous	Wood mouse	50% weed seeds (ground) 50% ground arthropods	21.7

There is a clear indication of the restricted treatment area using shielded spray application. The industry standard is for melon blocks to be planted at a maximum of 2 metres between rows with 1.2m wide beds. Only the interrow (the bare ground between rows) are sprayed using shielded sprayers with paraquat and diquat solutions to suppress weed incursion. This treatment area is restricted to 40% of the cropping area, therefore only 40% of a bird or mammal's diet could come from seeds or arthropods that have been in contact with the active. There is no application on the other 60% of ground planted with melon seedlings.

Paraquat:

Applying a similar logic to that presented for spot spraying in the AEA Report to shielded spraying, if an interrow maximum rate of 577g ac/sprayed hectare were applied (to a maximum of 40% of the cropped area) this would still fall within the APVMA proposed maximum rate of 231g ac/ha. The current label

[4] https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2023.7790

rates of 300g ac/ha and 400g ac/ha would therefore be maintained and this is a measure that will support the viability of the entire Australian melon industry.

Furthermore, if the refined bare soil maximum rate of 427g ac/ha is accepted , as per the logical conclusions drawn upon within the AEA Report then up to 1.067 kg ac/sprayed hectare should apply in which case the highest rate of 600g ac/ha would be maintained for older weeds.

A maximum spray area of 40% of the cropping area could be indicated on the label to account for risk assessment requirements as per EFSA guidance.

Paraquat/Diquat combination:
The spot spray argument also holds true for paraquat and diquat formulations. We would argue that the refined bare soil maximum rate of 531g acs/ha as proposed in the AEA report be supported and that the spot spraying logic discussed above be applied to shielded interrow sprays. This is turn would allow for a maximum rate of 1.32kg acs per sprayed hectare supporting continued usage in melons as an interrow spray recognising the requirement for changed labels to specify that a maximum of 40% of the block is to be sprayed.

Requirement for cucurbit specific residue data for diquat:

> *"Diquat is a Group 222 mode of action bipyridinium herbicide and is most commonly supplied as the dibromide salt. It is a non-selective contact herbicide and desiccant, absorbed by the foliage, with some translocation in the xylem. It accepts electrons from photosystem I (PS-I, electron diversion), resulting in interaction with the photosynthetic process to produce a hydroxyl radical and other reactive oxygen species that destroy unsaturated lipids and chlorophyll. It is inactivated on contact with soil and not taken up by plant roots. Diquat is used to control weeds before planting, before or just after crop emergence, and directed spray between the rows of established crops."* (APVMA, 2024)[5]

We understand that usage of diquat as a stand-alone herbicide in cucurbits, including melons, will not be supported under the current APVMA review based largely on the lack of residue data for cucurbits. We do note that residue data has been accepted for other vegetables, including fruiting vegetables of tomatoes and capsicums. The data provided for those crops has supported continued use of diquat in those crops up to 283g ac/ha and therefore we seek that this same usage be maintained for melons/cucurbits to encourage a data set being collected.

We further note that the supported harvest withholding period for orchards and row crops for pre-emergent applications or applications by a shielded spray is 'Not required when used as directed'[5]. The fact that these chemistries are not being applied directly to the melon crop nor to melon fruit, they are deactivated on contact with soil, they are not taken up by plant roots and the length of time between application and fruit harvest is at least 50 days makes it hard to understand how there could be any residue expected. Therefore, there is an argument to be made that this blanket removal of access is not supported by sufficient evidence.

[5] https://www.apvma.gov.au/sites/default/files/2024-07/Diquat%20Review%20Technical%20Report%202024.pdf

If there remains a commitment to limit access to and usage of diquat, we firmly believe there are many factors that support the use of residue data from tomatoes and capsicums being directly correlated to cucurbit crops. They include:

- This chemical is only ever sprayed in melon fields either during fallow periods or at early stages of crop emergence using shielded sprayers well before fruit set.
- Diquat is deactivated on contact with soil.
- Melon products have a thick inedible rind (unlike tomatoes and capsicums) reducing any food safety risks from residue.
- The fact that a withholding period is not required when used as directed is evidence in itself that no residue is expected.

The unnecessary requirement for specific cucurbit residue data will only add significant unnecessary regulatory burden on Australian melon growers without evidence to support it. However, if the collection of specific cucurbit residue data is necessary and supports retention of access then we will work with our industry to support the collection the necessary data for future consideration.

APVMA's lack of understanding about farming methods and the potential impact of assumptions made within the report:

Through our extensive review of the documentation and recommendations being made, it has come particularly clear that those making decisions within this review have a lack of understanding of current farming methods and usage of chemistry in a practical way. Therefore, we take this opportunity to highlight some of the key factors that the Australian melon industry believe have not been fully taken into account through these respective reviews.

The weeds that are being sprayed at this early stage in the crop cycle are very young (definitely not seed bearing), similar to the melon plants at the time of spraying (which are not being sprayed). This therefore means that there is very little in the paddock to attract certainly omnivorous or granivorous birds or mammals. It is not until fruit is set that animals are attracted to melon blocks. Furthermore, the application of these important chemistries are only applied to the inter-rows either side of the melon production bed (ie. No more than 40% of the cropping area).

In reality when applied in the dry, hot Australian conditions leaf material sprayed with Paraquat and/or diquat burns off within 2 hours of application, therefore making it less attractive to bird or mammals, and far less readily available for consumption.

Another aspect that is perhaps unique to melon and other horticultural crops is the requirement to abide by a number of food safety requirements in line with their food safety accreditation. This is being cemented into further red tape burden for these industries through the implementation of legislation at the State and Territory Government level to give effect to the Food Standards Australia New Zealand (FSANZ) Standard 4.2.9 for primary production and procession of melons.

FSANZ Standard 4.2.9 – Primary Production and Processing Standard for Melons[6]

4.2.9—6 Inputs – soil, fertiliser and water

- A primary horticulture producer and a primary horticulture processor must take all reasonable measures to ensure that any of the following inputs do not make the melons unacceptable:
    a. soil;
    b. soil amendments (including manure, human biosolids, compost, and plant bio-waste);
    c. fertiliser; and
    d. water.

Animal fecal matter is the biggest risk to food safety in the Australian melon industry. Melons are a vine crop that is not trellised therefore the fruit lies on prepared raised beds, making them more susceptible to animal intervention than in perhaps other industries where fruit doesn't touch the bare soil/ground. It is due to these risks that the Australian melon industry have invested millions of dollars in research, development and extension to prepare best practice management measures, guidelines and operating procedures to reduce these risks to as low as practically possible, including measures to exclude animals from melon blocks to prevent contamination by droppings. For this reason, melon growers employ bird deterrent devices, such as scare guns and scare crows. Similarly, exclusion fencing is employed by many growers to keep mammals out of growing blocks.

Lack of consideration of anything but environmental and human health impacts, with no cost benefit analysis of such a decision – and complete oversight of the significant cost impost to industry:

We are concerned that the APVMA has been unwilling to consider the economic impact to the agriculture industry when preparing their 'APVMA Special Gazette, 30 July 2024' to implement the findings of what was essentially a desktop review at best. There is no understanding of the cost impost that will be borne by the industry in these decisions, in fact they have been downplayed and dismissed before being considered. This needs reform as the industry's sustainability and its correlation with our nations food security must be considered in making such significant reform recommendations.

> *"Submissions related to commercial or financial impacts will be noted, however these cannot be considered by the APVMA to determine whether a chemical meets the statutory criteria (safety, efficacy, trade and labelling) in the Agvet Code".* [7]

In 2019, the New Zealand EPA conducted a similar review of paraquat and paraquat containing substances, however unlike the APVMA review they took into consideration the economic impact of preventing these actives continued use in agricultural industries. In ensuring they full appreciated the economic considerations of such a decision, the New Zealand EPA weighed the risks posed by the use of the chemical alongside the economic impacts of the agriculture industry losing access in making their final decision to restrict its use to horticultural and agricultural use only. In doing so, the New Zealand EPA agreed to set a maximum annual application rate and a maximum single application rate of 600 g ai/ha as this would encompass the majority of

[6] Federal Register of Legislation - Australia New Zealand Food Standards Code – Standard 4.2.9 – Primary Production and Processing Standard for Melons

[7] Paraquat and diquat proposed regulatory decisions | Australian Pesticides and Veterinary Medicines Authority

use patterns while mitigating the majority of human health and ecotoxic risks. This logical approach provides the best balance between the non-negligible benefits and risks associated with the use of paraquat containing substances. (NZ EPA, 2019)[8] We implore the APVMA to undertake a similar assessment and to consider the broader economic impacts of their decisions.

Summary of Recommendations from the Australian Melon Industry:

- Support the required access for Australian horticulture to specific and cost-effective chemistry, ensuring they can continue to provide the safest and most cost beneficial produce for Australian consumers.
    - And in doing so, review and amend the 'APVMA Special Gazette, 30 July 2024' to align with the comments received from industry prior to making a final decision.
- Accept the results presented by the Australian Environmental Agency (AEA, 2024) with regards to feeding habits and applicability of model animals to Australian wildlife, and as such support the melon industries access to usage limits of both paraquat and diquat (and joint active solutions) in accordance with the following:
    - Adopt a revised maximum rate of 427g ac/ha for paraquat as a standard for the Australian agriculture industry, as per the logical conclusions drawn upon with in the AEA Report – ensuring that the current label rates of 300g ac/ha to 400g ac/ha are maintained for use in row crops, vegetables and market gardens (fruiting vegetables: cucurbits).
    - Adopt a refined bare soil maximum rate of application of 531g ac/ha as proposed in the AEA report for paraquat and diquat combination solutions.
        - Apply the principles of optical spot spraying (for both paraquat and paraquat/diquat formulations) to the practice of interrow sprays using shielded sprayers – acknowledging that if only 40% of a cropping area is sprayed with the chemistry then only 40% of the diet of impacted birds and mammals is contaminated by the herbicide therefore a higher rate can be applied to the sprayed area. This would allow for the higher label rate for paraquat of 600g ac/ha to be maintained for interrow spraying in melons and for label rates to be maintained for paraquat and diquat formulations at the current rate for interrow spraying.
    - Continued use of diquat in row crops, vegetables and market gardens (fruiting vegetables: cucurbits) up to 283g ac/ha to support consistency of application across horticulture, including the Australian melon industry.
- Accept residue data from other fruiting vegetables for diquat being applied for cucurbits as explained earlier in the submission or support the extension of current usage levels to allow the appropriate collection of a comparable residue data set noting the low risk presented above to animal exposure or food safety matters.
- We implore the APVMA to ensure the consideration of broader economic impacts of their decisions, including undertaking a cost benefit analysis to determine the impact of this decision as it stands before making a final decision.

[8] https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP203301/APP203301_Final_Decision.pdf

On behalf of the Australian melon industry, I thank the APVMA for this consultation opportunity and for taking the time to allow us to provide our industry views for proper consideration prior to a decision. I would be happy to discuss any of the content of this submission with you in the progression of this matter.

Yours sincerely

Johnathon Davey
CEO Melons Australia

References

APVMA, Paraquat Review Technical Report, July 2024

APVMA, Diquat Review Technical Report, July 2024

Australian Environmental Agency Pty Ltd, Consideration of APVMA Technical Review Reports for Paraquat and Diquat, 18th October 2024 (to be submitted with GRDC and/or GPA submission)

EFSA (European Food Safety Authority), 2009. Guidance document on risk assessment for birds & mammals on request from EFSA. EFSA Journal 7(12): 1438, doi: 10.2903/j.efsa.2009.1438

New Zealand Environmental Protection Agency, 11th December 2019, Decision on Reassessment of paraquat and paraquat containing substances