

**Submission from selected Industries
On the EPA Call for Information on Glyphosate**

September 2021



Contents

1. Executive Summary2

2. Submitted Information.....2

3. Submitter Details2

4. Purpose of this submission.....3

5. Comments on call for information document4

5.1 Use pattern information4

5.2 Summary of use patterns across crops.....5

6. Mitigation measures and controls13

7. Impacts on Māori15

8. Benefits and alternatives15

8.1 Benefits of Glyphosate and effects of this herbicide being unavailable15

8.2 Availability of alternatives and reasons for using glyphosate over alternatives17

9. Concluding remarks and recommendations.....17

1. Executive Summary

This submission is made on behalf of 18 grower groups of berries, fruit, vegetable and arable crops (see section 3). The submission:

- provides use pattern information for critical uses of glyphosate herbicides, and
- details the benefits of glyphosate, and describes the negative consequences that banning or severely restricting this herbicide would result in.

Glyphosate is a vitally important tool for NZ's primary industries and it is essential that it remains available. Whilst there has been a lot of negative attention on this herbicide over the last few years, there is not any significant new information relating to its effects which has come to light. As a result, the grower groups supporting this submission do not believe grounds exist for reassessment.

2. Submitted Information

The information supplied is what is available as at August 2021. Further information may be provided if additional information that will be informative in the EPA's risk assessments is discovered.

Section 55 of the HSNO Act is clear in that information provided to the EPA that is likely to relate to an application that is yet to be lodged, is not subject to the OIA. The EPA's recently revised "Supplying confidential or commercially sensitive information under the HSNO Act" guidance document makes it clear that this includes reassessments. Accordingly, the submitters request that information contained in this submission be kept confidential as it contains commercially sensitive and private information and also request all personal information is withheld from publication.

3. Submitter Details

Joint submission on behalf of the following 18 grower groups:

- Blueberries NZ
- Boysenberries NZ
- Blackcurrants NZ
- Citrus NZ
- Foundation for Arable Research
- NZ Asparagus Council
- NZ Buttercup Squash Council
- NZ Feijoa Growers Association
- NZ Kiwiberry Growers
- NZ Kiwifruit Growers Inc
- NZ Tamarillo Growers Association
- Onions NZ
- Persimmon Industry Council
- Potatoes NZ
- Process Vegetables NZ
- Strawberry Growers NZ
- Summerfruit NZ
- Vegetables NZ Inc.

Postal address: PO Box 10629, Wellington
Phone: 04 473 6040
Email: Rebecca@solutionz.co.nz

4. Purpose of this submission

This submission is made on behalf of 18 grower groups of berry, fruit, vegetable and arable crops. It is intended to provide actual use pattern information to the EPA in response to the call for information on glyphosate. It provides answers to most of the questions raised in the EPA's feedback document. These 18 grower groups represent a significant contribution to the New Zealand economy. Table 1 includes figures for the number of growers, as well as the planted area and total value for each of the crops that regard the use of glyphosate as important for production of their crops.

Table 1: Production information for crops in this submission

Crop	# growers	Land area (ha)	Total value \$(m)
Arable crops	2,400	104,000	781
Asparagus	35	520	9.2
Blackcurrants	32	1,636	1
Blueberry	60	640	61.9
Boysenberry	19	206	5
Citrus	316	1,660	70.5
Feijoa	225	175	4.2
Kiwiberry	28	35	3.8
Kiwifruit	2,818	13,334	3,580
Onions	92	5,271	200.3
Persimmon	50	136	11.5
Potatoes	173	10,417	1,088
Processed Vegetables	600	7,875	316
Squash	24	6,642	62.7
Strawberry	110	276	33.6
Summerfruit	240	2,290	118.8
Tamarillo	40	100	3
Vegetables	760	11,500	420
TOTAL	8,022	166,713	6,771

Sources: FreshFacts 2020, industry estimates.

Note: Total value is for fresh and processed crops and includes both domestic and export markets.

These sectors have a combined value of over \$6.7 billion and are critical to regional economies. Combined they provide a very significant national benefit to New Zealand in terms of food supply and security, contribution to GDP and over 60,000 employment opportunities.

Additionally, the sectors represented in this submission are vital to NZ's recovery following Covid 19. NZ's economic recovery must focus on opportunities that offer growth potential and these sectors provide this as they have a very positive, proven track record of recent growth that is expected to continue domestically and globally. Growers represented in this submission produce crops throughout NZ's regions. These crops are sent to a diverse range of domestic and export markets and channel significant revenue and job opportunities into the regions where some of NZ's largest social and economic challenges exist. The forecasts of the negative impact of the pandemic on NZ's economy and social impacts are significant and will be felt for years, if not decades, to come. Now more than ever, NZ will be reliant on these

sectors to keep the economy afloat. These sectors are aligned with the government's Fit for a Better World¹ road map. In order to add \$44 billion in export earnings over the next decade, growers need to be able to continue to control weeds and minimise preventable losses.

Growers need access to a range of herbicides to manage weeds and enable the continued production of world-class crops. Glyphosate is critical to enable production of crops represented in this submission and plays an important role in growers' toolbox for enabling successful weed control. An estimated 20-40%² of food is wasted throughout the product lifecycle, including while at the growing stage. This is predicted to double without access to crop protection tools. Food waste has a negative impact on the environment and should be minimised where possible.

5. Comments on call for information document

This submission addresses questions raised in the EPA's call for information document that are relevant to crops represented in this submission. The EPA's call for information form also asks questions relating to:

- What glyphosate products are imported, manufactured, distributed / sold and volumes of these,
- How products are packaged, pack sizes, type, decanting or repackaging and storage,
- Impacts on Māori.
- Technical reports and studies.

This submission represents growers (end users) who use glyphosate to manage weeds. None of the groups represented import / manufacture / sell etc. glyphosate products. As such, this submission provides little feedback for these sections. These sectors understand registrants of glyphosate will supply this information to the EPA and consider that they and iwi are better placed to provide information around impacts on Māori.

5.1 Use pattern information

The information presented in the following table has been provided by those growers of the respective crops who use glyphosate. In instances where the use rate was very similar between growers, the information has been summarised to represent typical use patterns (i.e. minimum and maximum rates).

For registered products the rate of glyphosate ranges from 100 to 850 grams ai per litre or kilogram (alone or in combination with other actives).

¹ www.fitforabetterworld.org.nz/

² OECD-FAO Agricultural Outlook 2012-2021

5.2 Summary of use patterns across crops

Crop/s	Trade name (ai g per litre or kilogram)	Application					Comments
		Method	Growth stage & season	Number min – max	Product Rate	water rate	
Berry crops							
Blueberry	Various registered products including Roundup Pro 360, Flyphosate 360, Touchdown IQ	Band / boom or Knapsack	Seedling weeds	Usually 1 -2	Generally applied at about 2L product to 100L water	Standard material used for weed control in blackcurrants.	
Boysenberry		Boom					
Blackcurrants		Mostly boom application. Some follow-up spot treatment using knapsack.					
Strawberry		Mostly low volume knapsack. Some boom.					
Fruit and vine tree crops							
Citrus	Various registered products	Under tree boom, wiper or knapsack	Depending on weed presence	3-4 times per year, often with tank mix additive eg Glufosinate , Sharpen, Browndown	Label rates usually used in 150 to 200 litres per sprayed hectare. Only under tree which is usually 40 to 50% of total area	Directed or shielded spray or with wiper equipment. Is not applied near unprotected trees < 3 years old.	
Feijoa & persimmon	Various registered products	Under tree boom, wiper or knapsack	Depending on weed presence, pre or at flowering, pre-season orchard cleanup.	1-2 times per year, often with tank mix additive e.g. Glufosinate , Sharpen,	Label rates used in 150 to 200 litres per sprayed hectare. Only under tree which is usually 40 to	Directed or shielded spray or with wiper equipment. Various registered products	

				Browndown	50% of total area		
Kiwiberry	Roundup Ultra, Lion (360)	Ground spray, targeting narrow strip down length of vines.	Spring/summer (kiwiberry vines are actively growing)	2-3 x year spread through Spring/Summer period (typically August/January)	660-750ml/100L water	100-150L/Ha	Used to keep weeds under control along the strip where vines are planted. Middle of rows are kept under control by mowing.
Kiwifruit	Various registered products as approved by Zespri and included in Zespri Crop Protection Program	Quad / tractor mounted single, directed nozzle utilising air inclusion technology to minimise off target drift	From September to April as required	3 - 4	According to label rates, approx 50L of dilute mixture / hectare		Used to create a spray strip 0.5 - 1m wide down length of row which cannot be managed by mowing as this is where plants and posts are. Workers need to access these areas to perform their tasks and excessive weeds create a health and safety risk as hazards such as rabbit holes will be hidden. Weeds in loadout areas are also sprayed to control plant hosts of Mealy bug – a significant market access pest.
Tamarillo	Polaris 360, Roundup (360g/L)	Quad bike mounted wand pressure sprayer or knapsack	Spring - autumn after pruning and no foliage on trees	3 - 4	10mL / litre of mixture	200L/ha max 50-100L for subsequent spot spraying	1m strip / 0.5m each side of tree. Low pressure 20psi. Around trees 5psi to avoid contact with trees. Control of flat weeds and grasses among trees. Can damage Tamarillo leaves so application is done very carefully and targeted. Once foliage has grown, used outside orchard to ensure nearby nightshade is controlled as this is a potential breeding ground for psyllid and green peach aphid mosaic virus stopping weed growth (once foliage grows, weeds abate)

Summerfruit	Registered products at label rates. Various trade names.	Tractor mounted boom sprayer. PTO or battery driven for lower volume application.	Mixture of post-harvest as an autumn clean up, and/or late winter early spring. Possible further application during the growing season if required.	1 – 4. 2 most common	Registered products at label rates	400L/ha CDA (controlled droplet application s) known at 200L/ha or less	Spray / drift not to contact any part of trees, or green bark, suckers, buds, foliage or fruit Some alternatives exist which can be used for particular weeds, and these are chosen in place of glyphosate if resistant weeds are present. Relying solely on these however will develop resistance to these alternatives.
Arable crops							
Maize	Various trade names	Pre-plant weed control or termination of previous crop	Pre-plant or pre-emergence stale seed bed	1	720 - 1440 g ai/ha	150 - 200 L/ha	For direct drilling, strip till or pasture/cover crop termination before cultivation or sowing.
Herbage and amenity seed	Various trade names	Pre-plant weed control or termination of previous crop	Pre-plant or pre-emergence stale seed bed	1	720 - 1440 g ai/ha	150 - 200 L/ha	For direct drilling/minimum tillage or weeds termination before cultivation or sowing.
Cereals, pulses and cereal silage	Various trade names						Pre-harvest Wheat, barley, oats Spray 7-12 days prior to harvest when grain moisture <30%. Do not harvest within 7 days after spraying. Do not spray undersown crops. Do not spray crops harvested for seed. Note: FAR discourages using glyphosate as a pre-harvest desiccant in cereals as using product within label recommendation can still result in MRL being exceeded in cereals for milling. Milling wheat and malting barley contracts also require no glyphosate use pre-harvest.

Cereals and pulses	Various	Pre-plant weed control or termination of previous crop	Pre-plant or pre-emergence stale seed bed	1	720 - 1440 g ai/ha	150 - 200 L/ha	
Vegetable seed	Various	Pre-plant weed control or termination of previous crop	Pre-plant or pre-emergence stale seed bed	1	720 - 1440 g ai/ha	150 - 200 L/ha	For direct drilling, strip till or pasture/cover crop termination before cultivation or sowing
Fresh and processed vegetables							
Asparagus	Lion 490	Ground driven boom sprayer	<p>Winter: clean-up after end of fern growth, Spring: pre harvest stale seedbed, Summer: post-harvest clean-up (after harvest before fern growth)</p> <p>Preseason late winter weed clean-up. Important to have weed free beds for harvest period when residual pre-emergence herbicide is used just prior to spear emergence. Without clean beds then poor residual herbicide control.</p>	Max 3 per 12 months used late winter as clean up for the pre-emerge spray. Also used end of harvest clean up	3 - 5L/ha	200L/ha	<p>Following final harvest and immediately after removal of all spears but before crop regrowth occurs.</p> <p>Prior to planting or crop emergence. Do not treat emerging spears. In established ferns as a directed or shielded spray or with wiper equipment. Do not allow spray, spray drift or wiper surface to contact any part of plants. Very important tool to clean up perennial weeds, no cost effective alternatives. Without effective weed control, a significant drop in yield occurs due to competition of weeds during harvest and fern growth.</p> <p>Applied after last harvest before fern growth to clean up weeds produced during the harvest that have not been controlled by pre-emergence application.</p>
Buttercup Squash	Lion 490	Ground driven boom sprayer	Pre-emergence of crop	1-3 applications per crop	3 litres/ha	150-200 litres/ha	General weed control around squash when weeds are at cotyledon stage. Often with spiker

			Pre-plant (stale-seed bed), post-harvest clean up.				(saflufenacil, oxyfluorfen etc.) for improved control of hard to control weeds + resistance management
Onion (including leek, garlic, spring onion, shallot)	Lion	Self-propelled sprayer with air-induction nozzles with large coarse droplet size. Targeted speed to ensure low pressures of 2-2.8 Bar or 30-40 Psi	Pre-emergence	Once – only if weed pressure requires	4L/ha	400-600L/Ha @ 2-2.8 Bar or 30-40 Psi	Broad spectrum weed control when direct-sown crop is at pre-emergence stage. Lowest label rate used
Potato	Touchdown Polaris Dryphosate Lion	Self-propelled or towed or 3 point link sprayers with air-induction nozzles with large coarse droplet size. Targeted speed to ensure low pressures of 2-2.8 Bar or 30-40 Psi. Low - lowest label rates used.	Pre -cultivation	Once only – spray-off prior to cultivation – not during crop growth	2-4L/ha	250 - 350L/Ha	Spray off of pasture or previous crop growth
Kumara	Various trade names	Tractor mounted or trail boom spray, large droplet size to reduce spray drift, low	Used to kill grass pre-plant and for general weed control around buildings, hedges, roads etc.	As needed	At label rates		Sometimes also used mid-summer on paddocks being rested to control alligator weed (spot spraying) and also sometimes used after nursery beds are finished to tidy up weeds before cultivation.

	Country Mile Glyphosate 510 (510g/L)	pressure. Some growers use AI nozzles too.	Pre and/or post-season	0 - 2	2 - 4L/ha	200L/ha	Glyphosate is used for weed control pre or post season - never applied to actual kūmara crop. E.g. spraying out a paddock prior to cultivation or after harvest but before grass sown.
Root vegetables: e.g. carrot, parsnip, radish, swede/turnip, beetroot	Lion	Self-propelled sprayers with air-induction nozzles with large coarse droplet size. Targeted speed to ensure low pressures of 2-2.8 Bar or 30-40 Psi. Low - lowest label rates used.	Pre -emergence	Once only weed pressure requires - if	4L/ha	400 - 600L/Ha	Broad spectrum weed control when direct-sown crop is at pre-emergence stage.
Leafy vegetables: brassica, lettuce, baby / salad leaf, silverbeet, spinach, herbs	Max-Out 540, Lion and Lion 490	Boom sprayer, air induction nozzles/04 spray tips, coarse droplet size	Control weed seedlings during fallow, pre-plant (stale seed bed) and post-harvest crop clean up (in brassicas this is part of clubroot disease management: prevent re-growth and reduce underground host material)	1-3 applications / crop	2 L/ha (Max-Out 540) 3 L/ha (Lion 490) 6L/ha Lion	250 litres/ha (Max-Out 540) 200 litres/ha (Lion 490) 400 - 600L/ha at 2-2.8 bar or 30 - 10Psi	Control weed seedlings and post crop clean up. Fallow burn off when weeds are small pre-planting/postharvest weed control Used with LI-700 penetrant /drift retardant or esterified seed oil. Used alone and with partner herbicides to manage resistance: selection dependent on purpose and weed spectrum e.g. saflufenacil, oxyfluorfen, carfentrazone-ethyl, glufosinate. Broad spectrum weed control when crop is finished or on fallow ground. A low label rate used.

General farm / paddock maintenance	Max-Out 540	Knapsack or lance sprayer on farm utility vehicle with 1000 litre tank, 04 spray tips, coarse droplet size.	Spot spraying, fence lines, yards, tracks, building surrounds, waste areas.	As required	500 ml / 1000 L water	Spot spraying	Used with LI-700 penetrant /drift retardant. Used alone and with partner herbicides to manage resistance: selection dependent on purpose and weed spectrum e.g. saflufenacil, oxyfluorfen, carfentrazone-ethyl, glufosinate.
	Max-Out 540, Lion 490	Ground driven boom sprayer	Fallow paddock weed management	Before weeds go to seed	2 L/ha (Max-Out 540) 3 L/ha (Lion 490)	150-250 L/ha	
Stalk / stem vegetables: celery, rhubarb, sweetcorn, artichoke	Lion 490	Band / boom and knapsack spraying Boom sprayer, medium volume, 03, medium droplet size Ground driven boom sprayer	Pre-plant (stale-seed bed), post-harvest clean up.	1-3 per crop	3L/ha	150-200 L/ha	Weed seedlings. Preparation of stale seedbeds and interrow desiccant spraying of weeds Fallow burn offs when weeds are small Often with spiker (saflufenacil, oxyfluorfen etc.) for improved control of hard to control weeds + resistance management.
Fruiting vegetables: melon, pumpkin, cucumber, courgette, outdoor tomato	Various products Lion 490	Ground driven boom sprayer Pre-cultivation brownout with adjuvants. Boom spray 200L/ha Self-propelled sprayers with air-induction nozzles with large coarse droplet size. Targeted to	Occasional hooded weed sprayer inter-row application Pre-plant (stale-seed bed) post-harvest clean up.	1-3 per crop	3 - 6L/ha	150 - 200L/ha 400-600L/Ha @ 2-2.8 Bar or 30-40 Psi.	Hooded weed sprayer for outdoor tomatoes. Some squash plantings are post plant pre-emergence applications at 1.5L/ha Often with spiker (saflufenacil, oxyfluorfen etc.) for improved control of hard to control weeds + resistance management. Broad spectrum weed control when crop is finished or on fallow ground. A low label rate used.

		ensure low pressures of 2-2.8 Bar or 30-40 Psi. Low to lowest label rates used.					
Glasshouse fruiting vegetables: Cucumbers, Tomatoes, Capsicums	Various	knapsack		As needed	At label rates		While not applied near crops, is an essential herbicide used to control weeds around outside of glasshouses. If weeds are allowed to grow near to glasshouses, they can become a "green bridge" allowing insect pests and diseases to move into the glasshouse more easily.
Legume vegetables: peas / beans	Various	Boom sprayer	Either burn down pre cultivation, or direct drill. Sometimes also pre emerge with peas in direct drill situation. For beans often add very low rate 3/4-1 l/ ha to go with pre-emerge selective to try and remove hard to control red root seedlings as most selective herbicides are showing reduced effectiveness	1-2 per crop	At label rates	In accordance with label	An essential herbicide for broad spectrum control of weeds to allow full plant emergence and development

Specific answers to each of the questions in section 3 of the call for information document have not been provided as the information in the above table covers the majority of these. Some of the fields in the table are blank. Where this is the case, growers follow label instructions depending on the weed/s targeted. Note that whilst glyphosate is usually used on the weeds listed on the product labels, it is also usually efficacious against other weeds also. For most of the crops and uses listed above, no PHI or WHP is generally applicable.

Glyphosate is effective against a wide range of broad-leaved and grass weeds, both annual and perennial. Tolerant species (e.g. clover, volunteer potatoes, mallows) are well-known and can be targeted using companion herbicides as required.

6. Mitigation measures and controls

6.1 Mitigation measures are used to limit environmental or human exposure to glyphosate:

According to best practise (e.g. NZGAP) growers are directed to first always read the label. Growers represented in this submission are encouraged to follow the latest version of NZS8409.

They are also encouraged to maintain NZGAP and GrowSafe certification –qualifications that EPA has recognised in the Consolidated Hazardous Property Controls Notice as being adequate training to ensure protection of the environment for a range of application scenarios.

Growers also understand they must comply with the applicable regional air plans as well as requirements arising from the Health and Safety at Work Act and its regulations. These systems and standards require growers to wear suitable PPE and to only apply agrichemicals when conditions are appropriate (such as wind speed, stable underfoot conditions etc.).

In terms of PPE, growers would typically wear gloves, coveralls, enclosed footwear, masks or respirator and safety glasses as this is best practice under NZGAP.

6.2 How effective are measures in managing adverse effects that arise from using glyphosate?

These measures are considered very effective at managing the potential adverse effects that could arise from use of glyphosate products. The EPA has endorsed the GrowSafe certification as a qualification that demonstrates competence such that the environment will be protected from adverse effects, in the recently issued Hazardous Substances (Hazardous Property Controls) Notice. If it did effectively manage the potential adverse effects, then the EPA would not have made it an option for complying with the qualified loader and qualified contractor requirements.

Glyphosate and glyphosate products are of relatively low toxicity to human health. The requirements for PPE to be worn stemming from the Health and Safety at Work Act (and regulations) as well as NZS8409 ensure that what small risk glyphosate use presents to human health, is reduced even further.

MPI regulate food safety as well as risks to trade which might arise from the use of all crop protection products, including glyphosate, and so these other potential pathways for harm are managed to reduce risk in an effective way.

6.3 According to best practice - growers must check the weather forecast before spraying glyphosate products to ensure conditions are favourable (i.e. no wind or rain is expected). They will then only apply glyphosate products when weather conditions are appropriate.

6.4 Growers do sometimes spray close to waterways such as drains on their properties. However, it is important to note glyphosate products are not applied directly into or onto water bodies.

6.5 Storage: Glyphosate products are stored in their original, labelled container in an appropriate storage facility in accordance with applicable requirements as determined by their hazard classifications, as well as which other hazardous substances are being stored. These requirements vary depending on the specific classifications that each product triggers.

6.6 Other precautions when handling glyphosate products include those precautions and practises described in the standards, qualifications and systems referenced above.

Industry would be happy to assist EPA to understand the standards, qualifications and systems we have referred to, in order to assist the EPA with understanding how crop protection products are used.

6.7 Measures described are adequate to keep people and the environment protected. In light of glyphosate's relatively low toxicity, the programmes and standards followed for its application are more than adequate to protect people and the environment. In 2016 the EPA commissioned a scientific review of glyphosate called "Review of the Evidence Relating to Glyphosate and Carcinogenicity." This was in response to the flawed IARC monograph on glyphosate declaring it as probably carcinogenic to humans. This scientific review concluded that glyphosate is "unlikely to be genotoxic or carcinogenic to humans".

This submission agrees with this conclusion of the 2016 EPA report and no credible evidence to the contrary has been presented since. Any further information that has been produced supports this position. The "Agricultural Health Study"³ published an update to their longitudinal study of pesticide applicators which also shows that glyphosate is not a carcinogen. As noted on the EPA website, the Canadian PMRA has undertaken a review of glyphosate and concluded that products containing glyphosate do not present risks of concern to human health or the environment if used according to label directions (with some minor revisions arising as a result of the review). The statement issued by the PMRA in 2019⁴ describes how this 2017 decision was reviewed in response to public objections. It is recommended that the EPA examine this and update the EPA website to reflect that an additional review of the Canadian re-evaluation has been conducted which "left no stone unturned" in the words of the PMRA, in response to the objections but that the concerns raised by the objectors could not be scientifically supported when considering the entire body of relevant data, and that the objections did not create doubt or concern regarding the scientific basis for the 2017 conclusion.

As the NZ EPA's scientific review (and numerous others from around the world) concluded in 2016 that glyphosate is "unlikely to be genotoxic or carcinogenic to humans", grower groups represented in this submission do not hold concerns that the use of glyphosate products impacts people's health. As glyphosate binds to most soil types this reduces its movement into ground and surface water. Glyphosate also has a relatively short environmental half-life. This combined with the low to moderate environmental toxicity hazard classifications mean that there are not concerns about glyphosate negatively impacting the environment either.

6.8 Disposal of any unused product

All growers are strongly encouraged to maintain current GrowSafe certification. GROWSAFE⁵ describes how:

- concentrated agrichemicals (unmixed),
- diluted (mixed) agrichemicals, and
- empty containers

must be disposed of.

A GROWSAFE certificate holder must be able to:

- Explain the management of risks and associated responsibilities for the disposal of agrichemicals and the empty containers.
- Demonstrate knowledge of the disposal options for agrichemical concentrates, spray mixtures and empty agrichemical containers, as defined in NZS8409:2004 (section 6). A new updated version (NZ8409:2021) was published August 2021.

³ <https://pubmed.ncbi.nlm.nih.gov/29136183/>

⁴ www.canada.ca/en/health-canada/news/2019/01/statement-from-health-canada-on-glyphosate.html

⁵ www.growsafe.co.nz/resources/online-manual/standard-manual/after-spraying/disposal-agchem/
www.growsafe.co.nz/resources/online-manual/standard-manual/after-spraying/container-disposal/

- Demonstrate knowledge of the disposal requirements for agrichemicals as set out in Hazardous Substances (Disposal) Regulations.
- Demonstrate knowledge of Agrecovery⁶ (for disposal of used containers / unused concentrate).

Any unused excess mixed glyphosate could be sprayed over the ground in a manner typical with the method being used or applied to adjacent wasteland (away from waterways).

GROWSAFE, NZ8409 and the HSNO disposal regulations are in place and all instruct growers on how to ensure that glyphosate substances are safely disposed of. Labels also carry directions for disposal.

For economic reasons growers do not mix up excess quantities of crop protection products unless it can be used immediately or within a short time frame (i.e. that morning / afternoon). It is very common to make up and then apply the product within the hour of it being mixed. Growers know the areas they wish to spray and so only make enough product to cover the area that needs treating.

It is understood that the Ministry for the Environment is currently working through the process of making agrichemicals and their containers priority products under the Waste Minimisation Act. Most glyphosate products on the commercial market are manufactured or imported by a member participating in the AgRecovery scheme. Our understanding of this is that the regulatory action by the MfE to declare agrichemicals and their containers as priority products is likely to result in AgRecovery or a similar scheme becoming mandatory across the sector.

7. Impacts on Māori

It is considered that iwi are better placed to provide feedback about the potential effects of glyphosate on the relationship of Māori with their ancestral lands, water, sites, wāhi tapu and taonga flora and fauna. However, we note that there are benefits described in sections below which are relevant to this relationship and this should be acknowledged by the EPA.

8. Benefits and alternatives

Farmers and growers choose to use glyphosate because it is a safe, efficacious herbicide which enables them to practice effective, sustainable weed control.

When considering alternatives, the EPA needs to understand and appreciate herbicide resistance and the risks that it poses to ongoing sustainable control of weeds. Herbicide resistance is a significant threat to the ability of growers to maintain commercially viable operations and it is poor practice for growers to rely on only one active ingredient for weed control as this would promote the development of resistance. Instead, most growers use glyphosate in conjunction with other actives, to ensure that weeds are being controlled by multiple modes of actions, which makes the development of resistance significantly less likely. In this sense, because of the wide range of weeds against which it is efficacious, its high degree of efficacy and its translocating mode of action, there are no true alternatives to glyphosate. No other actives possess these same properties. Perhaps more important is also that glyphosate products are usually relatively low toxicity – both products themselves, but even more so the diluted spray which is applied. Some other herbicides have hazard classifications which reflect higher risks to human health and the environment.

8.1 Benefits of Glyphosate and effects of this herbicide being unavailable

Glyphosate is a generalist, non-residual herbicide which is effective against a very wide range of weed species. Glyphosate translocates within a plant, which is to say that it will control the

⁶ www.agrecovery.co.nz

entire weed, rather than just those parts that it comes into direct contact with. This helps provide good kill of underground weed structures (i.e. roots) resulting in lower weed growth than many other herbicides. This is also a useful property when spraying off crop residue post-harvest as it reduces underground host material thus reducing carry-over of soil-borne pests and diseases.

Being a non-contact herbicide is advantageous for many uses as it means that complete coverage of all surfaces of the weed is not necessary. Its non-residual activity makes it suitable for stale seedbed preparation for all crops and pre-emergence application in direct seeded crops and asparagus. Glyphosate also has a favourable safety profile with products often only triggering low degree hazards for human health, and a category 2 hazard classification for toxicity to aquatic invertebrates. These factors, as well as its generally high efficacy make glyphosate ideal for inclusion in herbicide rotation programmes for a wide range of primary producers.

Because of the large role that glyphosate plays in weed control as a practice, it is necessary to consider the importance of weed control in general when attempting to evaluate the benefits of glyphosate individually.

Weeds are a massive cost to primary producers. A recent report from AgResearch conservatively estimated that the cost of a small number of high-profile weeds in New Zealand, exceeds \$1.658 billion per year⁷. This figure focused on the loss of production caused by a select group of prominent weeds and did not consider costs associated with weed control itself. This means that the true cost of weeds is even greater than this figure.

The cost of weeds to the New Zealand economy will grow further if access to glyphosate is impeded. Weed control is necessary to stop weeds competing with crops (and desired plants) for water, space and nutrients. When crops are competing with weeds for these, the result is significantly lower yields, usually to the point that production would be occurring at a loss, and depending on the crop, quality may be impacted to the point that harvesting is not worthwhile as what is produced is unsaleable.

Weed control is essential for both phytosanitary and biosecurity reasons too. Weeds can provide a reservoir for pests and diseases of concern, such as nightshade harbouring Pepino mosaic virus, a disease affecting solanaceous crops. Accordingly, practicing good phytosanitary hygiene by controlling weeds near property boundaries or around the edge of glasshouses is an essential practice to control current and any future diseases and pests of concern, keeping them away from commercially important crops. Glyphosate is also an essential biosecurity tool to control any unwanted weeds that may arrive in NZ and affect NZ's native plants / forests and cropping areas.

Restricting the use of or banning glyphosate would jeopardise not only horticulture and agriculture, but also New Zealand's ability to respond to a biosecurity incursion of new invasive weed species. Given glyphosate's efficacy against a wide range of weeds, it is likely that it will also be efficacious against any newly arrived weeds.

Sometimes the question is raised as to whether chemical weed control is required at all and hand-weeding is proposed as an alternative. For some growing situations hand-weeding can be incorporated as part of a weed control programme however it cannot be the only means by which weed control is achieved. The Health and Safety at Work Act requires that PCBUs ensure the health and safety of their workers so far as is reasonably practicable. A shift to hand-weeding as the primary means of weed control would pose a significant risk in this regard so availability of other safe, efficacious control options such as glyphosate is important from a human health and wellbeing perspective. Not controlling weeds altogether, or doing a poor job of this, can also jeopardise worker safety as weeds can obscure trip hazards such as rabbit

⁷ www.agresearch.co.nz/news/economic-impact-of-weeds-far-greater-than-billion-dollar-estimate

holes and rocks which can cause injury to workers whose attention is usually focussed on the growing vines/trees/crop.

Glyphosate use has enabled some industries and production systems to adopt direct drilling and minimal cultivation techniques, such as the arable sector. This has been an important step to reduce soil erosion by wind, and rain erosion. Traditional arable cropping pre-glyphosate required bare-soil fallowing to kill weeds. Bare soil and cultivation are associated with leaching of nitrates which is in conflict with current land management goals from Central and Regional Government. There are clear environmental benefits that such practices bring and it is largely glyphosate use which has enabled these practices to become more widespread.

Glyphosate is also a very important conservation tool for NZ. The Department of Conservation rely on glyphosate to protect and restore NZ's natural heritage⁸. Growers cannot speak directly for how regional councils or DOC apply or use glyphosate, but many farmers and growers are involved in managing noxious and invasive weeds on their own land too, even if that specific land is not currently in use for production. Doing this provides a direct benefit to all New Zealanders as it helps protect native flora and fauna from species which would otherwise suffer harm through having to compete with greater numbers and densities of these weeds, greatly disrupting NZ's natural ecosystems across landscapes. Populations of such weeds would grow faster and spread quicker if they were not controlled by farmers and growers. The EPA should take steps to encourage growers to continue such activities and avoid going down the path of restricting access to glyphosate which would likely result in a negative outcome for taonga species by making it more difficult for growers to help protect NZ's environment.

8.2 Availability of alternatives and reasons for using glyphosate over alternatives

The introduction of new herbicides onto the market is slow. This is due in part to the nature of chemical research, in that discovery of actives that display the desired properties takes years of research. Another contributing factor is the implementation of an increasingly complex regulatory system in NZ which imposes obstacles that are disproportionate to risks posed by research and development trials. This has hindered the research and development of alternatives. The EPA's shift in how applications, both for release and containment, are assessed over the last 5 years discourages the introduction of new products and research to discover them. As described earlier, there are no alternatives available that can replace glyphosate's wide range of weeds it is efficacious against, its favourable safety profile and its high efficacy.

Users represented in this submission do not hold concerns about the use of glyphosate products and the impact this has on public spaces as this active is of low toxicity and presents minimal risk.

If the use of glyphosate was further restricted it would have a negative effect on both NZ's native flora and fauna (as the fauna often rely on the flora as a habitat) as well as NZ's GDP and well-being – particularly for rural communities.

9. Concluding remarks and recommendations

The continued availability of glyphosate is vital to the sustainable production of the crops represented in this submission. To ban, phase out or overly restrict the use of glyphosate would cause some crops to no longer be commercially viable to produce, and jeopardises the efforts of the horticultural industry to prevent the development of herbicide resistance. The growers represented in this submission recommend that the EPA give due consideration to the numerous benefits of retaining this herbicide and recognise the important role glyphosate

⁸ www.doc.govt.nz/about-us/science-publications/conservation-publications/protecting-and-restoring-our-natural-heritage-a-practical-guide/common-herbicides-used-to-control-weeds/

plays in responsible weed management. There are no efficacious alternatives that could replace glyphosate and, as described in this submission, different modes of action must be rotated for successful resistance management.

If glyphosate was banned or heavily restricted, given the benefits of this herbicide and the lack of efficacious alternatives for the crop groups represented in this submission, the magnitude of negative impact would be massive. This is true both of growers and in relation to control of invasive weeds as it relates to conservation value and protecting our environment,

It is understood that EPA's concerns over glyphosate may have arisen from apprehension among some members of the public about its potential impact on the environment and human health, as noted from the number of requests that the EPA has received to reassess glyphosate, as released under the OIA on their website⁹. Data from credible overseas regulators and research programmes however is clear – glyphosate products are safe to use when label directions are followed. The EPA should base decisions on credible scientific evidence rather than conjecture and misinformation.

The HSNO Methodology order requires that EPA staff and its chief executive to advise the EPA on the basis of an objective and expert review of a substance and an assessment of the risks, costs and benefits relating to that substance. Glyphosate is safe to use and the EPA should apply the principles from the methodology order to decisions of operational prioritisation, such as whether or not to reassess a group of related substances, not just to decisions made under the HSNO Act. This will help the EPA to better fulfil the purpose of the Act by protecting human health and the environment in the most efficient and effective way possible, through focussing reassessment on those substances that are of greatest risk to human health and the environment, not just those that attract the most public attention.

⁹ www.epa.govt.nz/assets/RecordsAPI/OIA-response-29-June-2021-requests-for-reassessment-of-glyphosate.pdf