

1. Australia's report, under paragraph 1 and 2 of Decision Ex.I/4, on available information on alternatives.

Critical use exemption: Strawberry runners – Pre plant soil fumigation	
<i>Alternatives available</i>	<i>Possible date of registration, if required</i>
Chloropicrin (Pic)	<p>Not yet a technically feasible alternative to MB/Pic because of incidences of significantly lower pathogen control (particularly at low soil depths), weed control, runner yields, and runner fruiting quality in research trials.</p> <p>Requires development of complementary treatments (i.e. combinations of herbicides, MITC generators, and fungicides) to improve its ability to control pathogens and weeds at depth before being suitable for adoption by the runner industry. Not approved for use by runner certification authorities.</p>
1,3-D/Pic products	<p>Recent research shows that formulations of 1,3-D/Pic with lower concentrations of 1,3-D (e.g. TF-80® (20:80)) may reduce the risk of crop phytotoxicity.</p> <p>TF-80® is not technically feasible on its own because it does not control pathogens and weeds to the same level as MB/Pic.</p> <p>TF-80® is not registered and not available to Victorian runner growers, but current research is supporting its possible registration. A registration application for TF-80® has been submitted to the Australian Pesticides and Veterinary Medicines Authority (APVMA).</p>
Pic or 1,3-D co-applied with MITC	<p>A metham spading rig was imported into Australia from Europe in 2013 for application of MITC in trials, but has proved an ineffective application method on clay soils.</p> <p>Not technically feasible because co-application of MITC (as spade injected metham sodium or incorporated dazomet) with Pic and 1,3-D/Pic has caused significant phytotoxicity in runner crops.</p> <p>Not approved for use by the runner Certification authority.</p>

<p>Pic or 1,3-D co-applied with herbicides</p>	<p>Recent research has shown that the pre-emergent herbicide isoxaben with Pic or 1,3-D/Pic can improve weed control without causing phytotoxicity in runner crops.</p> <p>Not technically feasible because these combinations do not control pathogens to the same level as MB/Pic.</p> <p>Isoxaben is not yet registered for use in strawberries, but current research is supporting its possible registration. A minor-use permit application for isoxaben is being prepared to submit to the APVMA.</p> <p>Not approved for use by the runner Certification authority.</p> <p>Other pre-emergent herbicides co-applied with Pic or 1,3-D/Pic, including pinene, chlorothal dimethyl, metolachlor, napropamide, oxyfluorfen and terbacil caused phytotoxicity or lower yields in runners compared with MB/Pic, and are not technically feasible.</p>
<p>Methyl iodide</p>	<p>Withdrawn from registration and not available to Victorian runner growers.</p>
<p>Ethanedinitrile (EDN)</p>	<p>Trials with EDN recommenced in the runner industry in 2014/15.</p> <p>Not yet technically feasible because of inadequate pathogen control compared with MB/Pic, particularly at greater soil depths.</p> <p>Not registered and not available to Victorian runner growers, but research in the industry is supporting its possible registration. A registration application for EDN has been submitted to the APVMA.</p>
<p>Dimethyl disulphide (DMDS)</p>	<p>DMDS and DMDS/Pic were imported into Australia in 2014.</p> <p>Not technically feasible due to inadequate pathogen and weed control compared with MB/Pic.</p> <p>Not registered and not available to Victorian runner growers, but current research is supporting its possible registration. A registration application for DMDS will be prepared at the end of 2016, when two years of efficacy data are available.</p> <p>Still a long way from registration because DMDS is a new chemistry in Australia.</p>

Propylene oxide	<p>PPO and PPO/Pic are being imported into Australia for trials in the runner industry in 2016/17.</p> <p>Not registered and not available to Victorian runner growers. Registration applications for PPO and PPO/Pic can only be prepared when two years of efficacy trials are completed in 2018.</p>
Recaptured MB from QPS applications	Not registered and not available to runner growers.
Lower rates of MB (20g MB/m ²)	<p>Three years of trialling have not demonstrated bioequivalence between lower and standard (25 g MB/m²) rates. This research does not allow registration applications for lower rates to proceed.</p> <p>Rates of MB below 25 g MB.m⁻² are not registered for use in Australia and are not available to Victorian runner growers.</p>
Soil-less systems	<p>Soil-less systems for commercial production of Nucleus and Foundation stock are already adopted.</p> <p>Research shows that the current soil-less systems used for production of Nucleus and Foundation stock is the most technically efficient (i.e. produces the highest yields). Partial budget analysis shows that soil-less systems are currently not economically feasible for production of later generations of runners (Mother and Certified stock).</p>
Biofumigation	<p>Biofumigant crops do not release the same concentration of isothiocyanates into soil as commercial fumigants. Consequently, biofumigants have not produced the same level of pathogen and weed control as commercial fumigants.</p> <p>Current trials (2015/16) are evaluating the integrated use of biofumigants and alternative fumigants.</p>
Anaerobic soil disinfestation	<p>Pot trials with this method have commenced, but so far have delivered inconsistent pathogen control.</p> <p>Is currently a component of a new proposed research program to manage <i>Macrophomina</i> in the strawberry fruit industry, but is a long way from commercial trials due to practical difficulties with implementation on steep slopes.</p>
Rotation of MB with alternative fumigants	Not currently technically feasible because of lower pathogen control and failure to control volunteer strawberries.

<p>Impermeable barrier films</p>	<p>Previous trials demonstrated that impermeable barrier films do not retain MB for longer periods in the high organic soils at Toolangi than standard LDPE films.</p> <p>Currently impermeable barrier films do not offer a reliable mechanism for reducing application rates of MB because they do not remain in place for long enough in the runner industry (due to high winds).</p> <p>Rates below 25 g MB.m⁻² are not registered and not available to Victorian runner growers under impermeable barrier films or standard LDPE films.</p>
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