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CHEMICAL CONTROL OF WEEDS IN TEA LANDS

(This Advisory Circular supersedes Advisory Circular PU 3, Serial No. 03/08, issued in December 2008 and links with Circular No. WM1 Serial No.4/12 issued in 2012. Also this cancels Advisory Circular Nos. WM2 and WM3, Serial Nos. 10/03 and 11/03 respectively, issued in September 2003)

1. Introduction

Integrated Weed Management (IWM) approach inclusive of manual, mechanical, cultural and chemical methods (in rotation) is recommended as specified in TRI Advisory Circular WM 1. The use of herbicides has some advantages, such as selectivity and cost-effectiveness, but causes some crop damages, residual issues and negative environmental effects that need to be avoided or kept to a minimum by limiting number of applications to two rounds per annum.

TRI recommendations should always be followed along with minimum of one week Pre-Harvest Interval (PHI). Avoid spraying herbicides onto the tea foliage, and also prevent spray drift.

2. Control of Common Weeds

A volume of 450 - 550 L of herbicide solution is required to spray one hectare of tea field covered with weeds, when using a knapsack sprayer fitted with a nozzle having a swathe of 0.5 – 1 meter, maintaining 1 - 2 bars pressure, and walking at average speed while holding the nozzle 35 - 50 cm above the ground.

Active ingredient (a.i)	Trade name/s	Dosage	Remarks
Oxyfluorfen (24%)	Goal 2 E (24%) Goal XL (24%)	0.22% solution. 10 ml in 4.5 L of water. (1.2 L/ha in 450 -550 L of water per ha)	Ideal for new clearings. Apply to bare moist soil.
Diuron (80% wp)	Diuron (80%)	0.22% solution. 10 g in 4.5 L of water. (1.2 kg/ha in 450 - 550 L of water per ha)	Ideal for mature tea fields. Apply to bare moist soil. Apply with a surfactant at 1.2 L/ha, if weeds present.
Glyphosate (36% w/v) Glyphosate (41% w/w)	Roundup 36% Counter 35.5% Weedol 36% Supass 36% Destroy 36% Hatrik 36% Boursate 36% Harass 36% Glytoll 36% Touchdown 48% Teedol 36% Blaster 41% Glycel 41%	0.25% - 0.5% solution. 11.3 - 22.5 ml in 4.5 L of water (1.4 - 2.8 L/ha in 450 -550 L of water per ha)	Inactivated when in contact with soil. Avoid spraying in new clearings and pruned fields. Rainfastness is 5 - 6 hours. Lower dosage (0.25%) is for low weed density situations and tender weeds. Higher dosage (0.50%) is for high weed density situations and mature weeds.

Active ingredient (a.i)	Trade name/s	Dosage	Remarks
Paraquat 6.5%	Paroto (Paraquat 65g/l [SL])	0.38% - 0.6% solution 17 -27 ml in 4.5 L of water (2.1 - 3.3 L in 450 - 550 of water per ha)	Under restricted use Resistant weeds are Illuk, Couch grass, Amalai, Foxtail grass, Getakola, Thandampul, Welkohila, Alawangupul and Morning Glory
Glufosinate ammonium 15%	Basta (15%)	0.23% solution. 10.6 ml in 4.5 L of water (1.3 L in 450 - 550 L water per ha)	
2,4-D 55% or 72%	2,4-D Amine 72%	0.18% - 0.36% solution. 8 - 16 ml in 4.5 L of water (1 - 2 L in 450 - 550 water per ha)	Spray to control broad-leaf weeds such as Amalai, <i>Borreria</i> , <i>Mikania</i> , <i>Polygonum spp</i> and Morning glory.
	Hedonal D 55%	0.31% - 0.51% solution. 14 - 23 ml in 4.5 L of water (1.7 - 2.8 L in 450 -550 L water per ha)	Weeds which are grown over the tea bush should be removed manually.
MCPA 40% or 60%	Hedonal M 40 (40%) Lankem M 50 (40%) MCPA 40	0.45% - 0.54% solution. 20.5 - 24.5 ml in 4.5 L of water (2.5 - 3.0 L in 450 -550 water per ha)	
	MCPA 60 (60%)	0.32% - 0.36% solution. 14.3 - 16.4 ml in 4.5 L of water (1.75 - 2.0 Lin 450 -550 water per ha)	

3. Problem Weeds

To control the hard to kill weeds found in tea lands, blanket spraying of herbicides is not recommended. Instead, the following recommendations should be followed in isolation as spot applications.

Active ingredient (a.i.)	Trade name/s	dosage	Weed
Glyphosate 36% W/V or 41% W/W	Roundup 36% Counter 35.5% Weedol 36% Supass 36% Destroy 36% Hatrik 36% Boursate 36% Harass 36% Glytoll 36% Touchdown 48% Teedol 36% Blaster 41% Glycel 41%	90 ml in 4.5 L of water or 45 ml + 28 g Kaolin per 4.5 L of water	Couch (<i>Panicum repens</i>)
		45 ml per 4.5 L of water	Illuk (<i>Imperata cylindrica</i>)
Cocktail mixtures for problem weeds			
10 ml of MCPA (60%) + 27ml of Paraquat (6.5%) per 4.5 L of water			Getakola (<i>Borreria latifolia</i>)
9 g of Diuron (80%) + 23 ml of Glyphosate (36%) per 4.5 L of water			Getakola (<i>Spermacoce hispida</i>)
11.5 g of Diuron (80%) + 10 ml of 2, 4-D (55%) or 10ml of MCPA 60 % per 4.5 L of water			
9 g of Diuron (80%) + 27 ml of Paraquat (6.5%) per 4.5 L of water			
29 ml of Glyphosate (36%) + 23g of SA per 4.5 L of water			
12 ml of MCPA (60%) + 30 ml of Glyphosate (36%) per 4.5 L of water 12.3 ml - 13.6 ml of Glufosinate ammonium (Basta 15%) in 4.5 L of water			
18 ml of MCPA (60%) per 4.5 L of water			Arunadevi (<i>Sphaticola trilobata</i>)
12.3 ml - 13.6 ml of Glufosinate ammonium (Basta 15%) in 4.5 L of water			Thandam pul (<i>Crassocephalum crepidiodes</i>) Alavangu pul (<i>Erigeron sumatrensis</i>)

GUIDELINES FOR SAFE AND EFFECTIVE USE OF HERBICIDES

1. Adopt a selective spraying program in order to retain desirable weeds and to control resistant weeds. Such resistant weeds should be treated with specific herbicides at dosages recommended. Alternately, other more effective control measures may be adopted.
2. Select the most suitable herbicide based on the range of weed species present in the field. Use correct dosage of herbicide and mix thoroughly in clean water and then make up the spray volume required to cover the area to be treated. Wash spray tanks thoroughly in clean water before use to avoid any contamination.
3. Maintain the number of herbicide applications for the year to a minimum, and use a range of herbicides of different mode of action in rotation than continuing with a single herbicide. This would help in averting build-up of resistant weed species.
4. Do not spray herbicides on creepers growing over the tea bush. These should be pulled down and laid on the inter-row space and then sprayed. Mature woody plants and deep-rooted species should be slashed, and the tender regrowth be sprayed.
5. Spray weeds when they are relatively young, before they flower/seed. The ideal stage to spray would be when the weeds are about 10-15 cm in height.
6. Select a calm day for spraying, as wind could carry the spray drift away from the intended area of spray. Also avoid spraying during very hot period of the day.
7. Use a spray guard when spraying on the inter-rows of tea. This would prevent excessive spray drift on to peripheral branches and green stems.
8. Use lever operated, diaphragm type knapsack sprayers which are more appropriate for herbicide applications. All sprayers must be checked for proper performance and, the trigger valves and nozzles need to be checked for leaks.
9. Use the correct type of poly jet/flood jet nozzles (**yellow**: swath 0.5 m, spray output 1.6 l per minute or **green**: swath 1.0 m, spray output 1.2 l per minute) to spray herbicides along inter-rows.
10. Wear protective clothing when mixing and spraying herbicides.
11. Thoroughly clean the tank, nozzle and lance after use and wash the self and protective clothing used. Do not throw empty herbicide containers (particularly into streams and waterways) but ensure that they are smashed and buried to avoid reuse.
12. Careful supervision of the entire operation is absolutely essential to ensure safe and effective weed control.
13. Do not store herbicides with fungicides, insecticides, fertilizers and other agro-chemicals.

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