PEST MANAGEMENT RECOMMENDATIONS

Department of Agriculture
Peradeniya
2015

Message

The Department of Agriculture recommends new pesticides which are of new classes of compounds and improved formulations, continuously. By doing this the Department aims to reduce the amount of pesticides that goes into the environment while achieving a satisfactory management of pests which attach crops that farmer grow. Since last pesticide recommendation manual some of the pesticides that had been recommended earlier is banned for use in the country including the highly toxic compounds and high volume pesticides. All the chemicals which are recommended in this booklet are registered in Sri Lanka under the Control of Pesticides act No. 33 of 1980. This pesticides recommendation manual is designed principally for the researchers, extension staff, technical staff engaged in related activities in the private sector and pesticides sales and technical assistants who are employed in the pesticides sales outlets.

The agricultural landscape in Sri Lanka is changing. We are moving from green revolution to a white revolution in Agriculture. The white revolution envisages a continuous production throughout the year using different agro-ecological regions in the country. Environment friendly agriculture with good agricultural practices including integrated pest management is the basis of white revolution. It attempts to reduce pesticide usage, miss use and overuse of pesticides and use pesticides of low human toxicity.

Many officers of the Department of Agriculture who are working in all the regions of the country have contributed to develop the recommendations included in this book. I thank all of them for their valuable contributions.

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PEST MANAGEMENT IN AGRICULTURE

Agriculture production continues to be increased to feed the rapidly growing population. The introduction of high yielding crop varieties under monoculture along with other modern agricultural practices as green revolution technologies exponentially increased the amount of food production worldwide. However, most of high yielding varieties with narrow genetic base are inherently vulnerable to major pests and thus brought about a marked change in the pest status. The result has been a heavy and extensive use of pesticides for control of insect pests, diseases and weeds which are considered as an integral anxious component of modern agriculture. Despite many advantages, there are some potential hazards and risks associated with pesticide use. Agro-pesticides can be used safely and effectively without these undesirable effects, although there is always a risk associated with any activity. Problems mainly on health and environment result from the misuse, abuse and overuse of pesticides.

Conventional pest control tends to ignore the causes of pest problems and instead rely on routine, scheduled calendar based pesticide applications or application of pesticides immediately after observing the pest without considering damage thresholds. Pesticides are often temporary fixes and ineffective over the long term. Thus, use of integrated approaches has been recommended for the management of agriculturally important pests, diseases and weeds. Intention of this manual is not to promote pesticides but to guide all concerned parties for judicial application of pesticides, if at all, there is a real need of application of pesticides as a final option of the management strategies.

Integrated Pest Management (IPM) involves a combination of various measures in compatible manner to make sure the effective pest management with minimum reliance on low toxic chemical pesticides as an ultimate option. IPM in a broader is a program of monitoring, prevention and intervention for controlling the pests with the emphasis of minimum reliance of chemical pesticides reducing environmental pollution and health hazards.

Monitoring (Observation) methods:

1. Identification: Identification of pests and beneficial organisms in the cropping system is of prime importance before any pest management strategy is executed. Proper education at farmers' level by all extension agencies is very essential so that farmers can readily identify the pests and beneficial organisms to take up appropriate measures in time.

2. Surveillance and forecasting: Periodical studies on climatological changes are made in relation to pest dynamics of each agro ecological region. Long term observations on pest dynamics initially made from light traps, sticky traps , spore traps, pheromone traps etc can be analysed in order to make appropriate forecast on pest/ disease appearance. Scientific surveillance and forecasting will enable extension workers to pass on proper recommendations to farmers for timely and appropriated crop protection measures.

3. Diagnostics: Symptoms and signs manifested on crops due to pest infestation and disease infection are to be correctly and timely identified for planning of all possible preventive and curative measures.

4. Scouting: This includes regular site inspections and trapping to determine the types and infestation levels of pests at each site. Thus, frequent scout for pests, diseases and beneficial organisms in and around the crop will enable farmers to plan for strategic measures in pest and disease management. In cases where beneficial insects are abundance and pest incidence is below the thresholds, farmer need not to go for chemical control measures.

5. Economic threshold levels (ETL): Pests are virtually never eradicated. Pest populations must be maintained below a certain level. ETL can be defined as the population density of pest/ disease/ weeds which can cause sufficient loss to justify the cost of control. ETL for major plant protection concerns should be standardized and made available to farmers for them to initiate proper management operations.

6. Pheromones: Erecting pheromone traps in fields helps in pest monitoring. It can also be used for “attract and destroy” method of pest control which indirectly helps in reducing mating, egg laying and pest proliferation on crop.

Preventive methods

1. Cultural practices: Cultural operations like summer and pre monsoon ploughing will expose soil insects and pathogens to adverse seasonal conditions which perish them. Periodical inter cultivation operation are done to minimize weed populations. Similarly keeping field bunds and other un-arable pockets in and around the field free from weeds eliminate alternate hosts.

2. Crop rotation: Mono-cropping in a same field over a long period of time provides suitable micro environment and host plant availability for thriving and multiplying of pests. Growing of suitable non-preferred crops alternatively will break the host-pest relationship.

3. Intercropping / trap crops: Intercropping of more than one crop in the same field will reduce some plant health problems by enhancing the activity of beneficial insects and reducing weed populations. Some plants more preferred by some pests can be grown in the crop as trap crops to reduce pest incidence on the main crop. Marigold which attracts Heliothis pest can be grown in main crop of chilli, capsicum, tomato will reduce Heliothis damage on the main crop. Further, marigold can repel soil borne plant parasitic nematodes.

4. Resistant varieties: Cultivation of resistant / tolerant varieties helps in suppressing pest and disease incidences especially in endemic areas. This is the best cost effective and sustainable pest management strategy.

5. Water management: Proper water management by judicious irrigation, adopting drip and sprinkler systems where ever possible will reduce weed population, some insect pests and diseases. Soil pests can effectively be managed by an appropriate water management.

6. Protected culture: Crops can easily be protected from most of insect by growing inside the protected structures.

Intervention methods:

1. Mechanical control: Mechanical methods can initially be practised by individual farmers or as a community before embarking on any other methods of pest control. Light traps can attract adult stages of many destructive pests and killed before increase the population density. Rouging out of disease infected plants or plant parts is a effective disease management strategy during the early stage of disease development.

2. Biological control: In nature, many organisms surviving by feeding on other insects, disease causing organisms and weeds are available in abundance. Such organisms can successfully exploit for management of pests as bio control agents. Papaya mealy bug *Paracoccus marginatus* has successfully managed by releasing a parasitic insect. Lady bird beetles are potential natural enemies of aphids. Insecticidal properties of many strains of bacteria, fungi and viruses have been identified. *Bacillus thuringenisis*, nuclear polyhedrosis viruses and entomo-pathogenic fungi like *Beauveria bassiana*, *Verticillum lecani* have potential for commercial use. Fungal antagonists like *Trichoderma viride* and *T. harzianum* are useful bio control agents for control many soil borne fungal pathogens. Scientific mass raring and inundative release of such beneficial insects and organisms will play an important role in keeping pest population under check without disturbance in ecosystem and environmental pollution.

3. Chemical control: Most pesticides are toxic in nature as per their intrinsic properties. The use of pesticides should not be regarded as the only solution to any pest problem but if necessary they should be used in a judicious manner. When the use of pesticides is necessary, pesticide users should handle pesticides safely and responsibly. Under IPM, chemicals should be used only as a last resort. Pesticide users should also read and follow label instructions. Such good practices can protect human health and the environment. It will not only reduce the use of pesticides but also prevent the development of pest resistance and thereby enhance the effectiveness on pest control, but when used, the least-toxic materials should be chosen, and applied to minimize exposure to humans and all non-target organisms.

INTRODUCTON TO USE OF PESTICIDES

By the registration procedure a mandatory requirement of the control of pesticides acct No. 33 of 1980 pesticides that have been proven to affect health or have environmental consequences are not registered and hence not available for general use. By their very nature most pesticides are

toxic but by paying attention to the selection of a suitable pesticide its formulation and method of use it is possible to reduce not only exposure to workers but also detrimental effects to the environment.

This manual provides guide lines that may be helpful for proper use of pesticides to mitigate pest problems while ensuring and economic advantage for the farmers. Updated information on recommended insecticides fungicides and herbicides are arranged under different sections in this manual.

Pesticides are available in different formulations such as liquids (water soluble and emulsifiable concentrates) wettable powered granules and water dispersible granules etc. They are sold in the market under different trade names. Therefore, for the conveniences of the end users trade names of the pesticides are given gains their common names in a separate list at the end o each major section.

Pesticide application

Usually spray volume for a given area is a function of several factors including the type of sprayer (Knapsack vs. Power) walking speed of the applicator nozzle type canopy size of the crop etc. Accordingly the application rate per hectare becomes more important that the dilution rate. This allows farmers to mix pesticides as necessary and accurately and prevent the waste and discharge of low or over doses rather than blindly using pesticides. However prominence has given to the spray volume while calculating the amount of total pesticide that is required to apply on a given crop. Since the spray volume for a crop may vary with the developing canopy size three basic canopy sizes have been identified as low canopy medium canopy and high canopy and approximate spray volumes required for the canopy sizes have been developed to determine the rate of application per ha. Keeping the dilution rate more or less fixed. It is important to note that all crops do not encompass all there canopy stages during their growth cycle. Certain crop reach only a low canopy during their growth period (onions) while some others starting from low canopy move on to medium canopy at later stages in their growth cycle (beans). There are few others that cut across all three canopy stages during the growth cycle (cucurbits).

Canopy size of crops	**Required spray volume l/ha**
Stage 1: Low canopy	320-400 l/ha (20-25 tanks/ha*)
Stage 2: Medium canopy	500-600 l/ha (30-35 tanks/ha*)
Stage 3: High canopy	700-800 l/ha (40-50 tanks/ha*)

- *Tank capacity is considered as 16 litres

Thus total spray volume needed for fungicides and insecticides may vary according to the canopy size of ta given crop. Unlike fungicides and insecticides which may be applied at different canopy stages herbicides ae usually applied either before or after early crop emergence (low canopy stage). Thus the total spray volume mostly be around 320-400 l/ha. Further lower dose is recommended when weeds are at young stage while the higher dose when weeds are little matured. On the other hand under non crop situation s it is appropriate to adopt high volume for post emergents. Further herbicides should be applied thoroughly to wet the canopy. In all herbicides applications it is essential to maintain about 30-45 cm height from target surface to the nozzle.

For proper use of pesticides

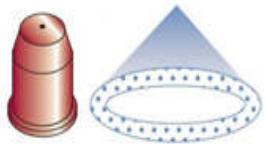
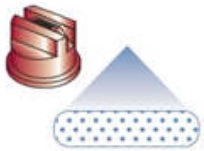
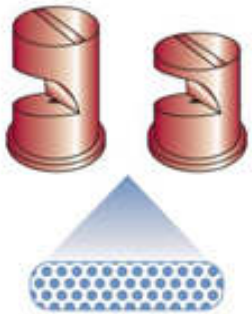
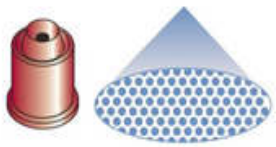
- Read the pesticide label carefully
- Strictly follow the pesticides recommendations
- Select the least toxic and least persistent pesticide
- Select formulations which combine maximum efficiency with minimum risk
- Apply on to the target area with the minimum amount of pesticide required
- Select the application method which ensure minimum contamination of crops and environment and other greater safety to the applicator while provided a greater efficiency of control
- Time the treatments in relation to most vulnerable stage of pest development
- Adhere strictly to the established pre harvest intervals
- Adopt crop rotations to arrest continuous use of the same pesticides over longer period of time
- Use pesticides based upon the level of pest infestation but no a prophylactic basis
- Do not use pesticides with same mode of action continuously

Pesticide safety

Pesticides are potentially dangerous chemicals when not properly used. Spray operators should be aware of hazardous nature of pesticides for pest beneficial organisms environment and human health before spraying. Most of this information is available in the pesticide label. As spraying can be on crops of varying heights determine which parts of the body is most liable to be exposed to pesticide drift and select appropriate protective equipment and clothing such as goggles respirator gloves hat boots long sleeved shirts long trousers etc. during mixing and application of pesticides. Smoking and eating should be totally avoided while handling pesticides.

NOZZLE CHOICE FOR APPLICATION OF PESTICIDES

Using the correct nozzle enables safer and more efficient spraying. It is very important that appropriate nozzle should be supplied with the sprayer to make them freely available in all farming environment and all spray operations needed to be educated to enable them to select the correct nozzle most suitable for the occasion.

Type of Pesticide	Type of Nozzle	Nozzle and Spray Pattern	Approximate Pressure (Bars)
Insecticides and Fungicides	Hollow cone nozzle		3
	Flat fan nozzle		3
Herbicides	Deflector nozzle		1-2
	Flat fan nozzle		1-2

Remarks

- Always apply pesticides after proper spray calibration and select the rate of application according to the appropriate growth stage of the crop.
- Hollow cone nozzles are used generally for spraying of insecticides and fungicides to foliage and give good coverage on the outer parts of the leaf canopy.
- Deflector nozzles (also called poly jet, food jet, impact, flood or anvil nozzles) are also used for application of herbicides where only single nozzle is used.
- Flat fan nozzles are used for spraying on to flat surfaces for example: for application on flat foliage to the soil surface and for application of insecticides to walls for the control of product pests.
- Do not apply pesticides to drain off from the leaves
- Never use four hole or five hole hollow cone nozzles for application of pesticides
- Maintain 50 cm distance between the nozzle and the target spray surface.
- Adjustable multipurpose nozzles are not recommended for using in crop protection
- Nozzle blockage should be removed by cleaning with water of failing that use a soft probe such as a strong grass stalk. Never try to blow it clear with the mouth or use wires or ping which might damage the orifice. If necessary replace the nozzle with a new one.

INTERNATIONAL FORMULATION CODING SYSTEM

Following is the list of formulation types and their International codes as introduced by GIFAP and now adopted by the FAO. These two letter codes appear on pesticide tables.

CS - Capsule suspension
DC – Dispersible concentrate
DP - Duster Powder
EC - Emulsifiable concentrate
EW – Emulsion oil in water
GR Granule
OD - Oil dispersion
RB – Ready to use bait
SC – Suspension Concentrate
SG - Water soluble granules
SL - Soluble concentrate
SP - Water soluble powder
WG - Water dispersible granules
WP – Wettable powder
WS - Water dispersible powder for Slurry treatment

INSECTICIDES

Department of Agriculture
Peradeniya
2015

LIST OF RECOMMENDED INSECTICIDES FOR AGRICULTURE PEST MANAGEMENT- 2015

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Rice thrips	**For seed treatment:** Thiamethoxam 70%WS Imidacloprid 70% WS	 **4A** **4A**		 20g/500ml water/100kg seed 20g/500ml water/100kg seed			In endemic areas and in late planted crops it is strongly advisable to treat the soaked seeds with insecticide powder dissolved in water before incubation. Wear gloves during handling chemicals and broadcasting seeds.
	For foliar application: Ethiprole 100g/l SC Carbosulfan200g/l SC Diazinon 500g/l EW	 **2B** **1A** **1B**	 10ml 20ml 15ml	 320ml 640ml 480ml	 400ml 800ml 600ml	 14 14	Apply foliar sprays when 50% of leaves/hill show damage symptoms.
Rice gall midge	Fipronil 0.3% GR Diazinon 5% GR	**2B** **1B**	- -	12kg 22kg		14 14	When damage symptoms appear, it is too late for effective control. In endemic areas, as regular practice treat nurseries 5 days after seeding at 15-20g/10$m^{2.}$ Broadcast granules on wet mud or into 1cm of standing water 1-2 weeks after transplanting or 1-3 weeks after broadcasting (ETL-5% Galls)

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Rice leaf folder	Azadirachtin10g/l EC	**UN**	50ml	1600ml	2000ml	07	Apply insecticides when 25% of the leaves show more than 50% leaf damage or 10 live larvae (in rolled leaves) in 10 randomly selected hills.
	Chlorfluazuron 50g/l EC	**15**	8ml	256ml	320ml	10	
	Methoxyfenozide 240g/l SC	**18**	10ml	320ml	400ml	10	
	Chromafenozide 50g/l SC	**18**	10ml	320ml	400ml	10	
	Flubendiamide 240g/IWG	**28**	1.3g	48g		07	
	Chlorantraniliprole+Thiamethoxam 40%WG	**4A/28**	2.5g	100g		10	
	Novaluron 100g/I EC	**15**	10ml	320ml	400ml	14	
Stem borer	Carbosulfan 200g/l SC	**1A**	30ml	960ml	1200ml	14	Apply insecticides only when damage exceeds 10% dead hearts or 5% white heads.
	Fipronil 0.3%GR	**2B**		12kg		14	
	Thiocyclam 4G	**14**		12kg		14	
	Chlorantraniliprole20%+Thiamethoxam 20% WG	**4A+28**		50g			
Brown plant-hopper	Ethiprole 100g/lSC	**2B**	15ml	480ml	600ml	14	Apply insecticides only when number of BPH (nymphs+ Adults) exceeds 5-8/hill at tillering and 8-10/hill at matuarity. Before granules are applied drain water completely and apply to moist soils. When sprays are used direct to the base of the plant.
	Etofenprox 100g/l EC	**3A**	15ml	480ml	600ml	07	
	Thiamethoxam 25%WG	**4A**	3g	480ml	600ml	14	
	Imidacloprid 70%WG	**14**	1.5g	50g	60g	14	
	Thiocyclam 50%SP	**15**	10ml	320ml	400ml	14	
	Chlorantraniliprole20%+Thiamethoxam 20% WG	**4A/28**	3g	100g	600ml	14	
	Buprofezin 25% SC	**16**	15ml	480ml	100g	10	
	Clothianidin 15% SG	**=**	2.5g	80g			

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Paddy bug	Carbosulfan 200g/l SC Diazinon 500g/l EW Thiocyclam 50% SP Sulfoxaflor 240SC Sulfoxaflor 50WG	**1A** **1B** **14**	40ml 30ml 25g 6ml 3g	1280ml 960ml 800g 192ml 100g	1600ml 1200ml		Apply pesticides when the bug density 1 per 10 hills. Follow the same recommendation for pentatomid bug.
Case worm	Refer to rice leaf folder						
Mole cricket	Diazinon 500g/l EW	**1B**		10ml/1kg rice bran (bait)		14	
Field crab	Diazinon 500g/l EW[2] Fenobucarb 500g/l EC	**1B**	30ml 30ml	Mix 3ml of insecticide in 1Lt. of water		14 14	Squirt insecticide solution into crab burrows after removing the swirl plate from the nozzle.
Leaf mites	Pl. refer general pests						
Sheath Mite	Fenpyroximate 50g/l EC Etoxazole 10%SC Hexithiazox10%WP	**21A** **10B** **-**	8ml	300ml 300ml 900ml	600ml		
Rats	Difenacoum0.005%RB Coumatetralyl0.0375%RB Brodifacoum0.005%RB Difethialone0.0025%RB Flocumafen0.005%RB						Start baiting soon after transplanting and continue upto grain maturity. Place the bait inside a piece of bamboo about 1 foot long.(40 baiting stations/ha)

VEGETABLES: BEANS							
Crop/ pest	**Common name of the Insecticide**	**MOA Group**	**Dilution (ml or g per 10L**	**Rate of Application (Product ml or g/ ha)**		**PHI Days**	**Remarks**
				Low foliage	**High foliage**		
Bean fly	**Seed Treatment:** Thiamethoxam 70%WS	 **4A**	 3.5g/kg seed				Mix 1.5g of insecticide in 8-10ml of water and mix with the seeds, and keep for about 1 hour before planting. Wear gloves when handling chemicals and planting treated seeds.
	Carbosulfan 200g/l SC Diazinon 500g/l EW Thiamethoxam 75%SG	**1A** **1B** **4A**	30ml 40ml	960ml 1280ml 190g	1800ml 2400ml	14 14 14	Apply at 7 days after planting or when first pair of leaves appear and repeat after 2 weeks if necessary. Repeat application at flowering if infestation is severe. Diazinon is incompatible with copper containing compounds.
Bean pod borer	Etofenprox 100g/l EC Novaluron 100g/l EC Chlorfluazuron 50g/l EC Flubendiamide 24%WG Chloranthraniliprole 185g/l SC Chloranthraniliprole200 g/kg + Thiomethoxam 200 g/kg WG Spinosad 450g/l SC	**3A** **15** **15** **28** **28** **28+4A** **5**	15ml 10ml 10ml 1.25g 2ml 1.5g 3ml	480-600ml 320-400ml 320-400ml 100-120g 90ml 70g 120ml	750-900ml 500-600ml 500-600ml 120-150g 140ml 110g 180ml	07 14 10 07 03 14 07	Start spraying at flowering and repeat at 10-14 days intervals if necessary. Three sprayings may be necessary for pulses.

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
White fly Aphids Thrips (Bean yellowing virus Vectors)	Thiamethoxam 70%WS Thiamethoxam 25%WG Dinetofuran 20%WP Imidacloprid 70%WG Chlorantraniliprole20%+Thiamethoxam 20% WG[5] Diafenthiuron 50%WP Thiocyclam (Hydrogen Oxalate) 50% SP Buprofezin 10%WP	**4A** **4A** **4A** **4A** **28+4A** **12A** **4B**	 3g 9g 1.25g 2.5g 6g 25g 6g	 120g 300-360g 60g 100g 240g 1000g	 450-540g 120g 480g	 14 14 14 10 07 14 21	Seed treatment with 3.5g/1kg seeds.
CABBAGE							
Cabbage leaf eating caterpillars	Etofenprox 100g/l EC Spinosad 25g/l SP Emamectin benzoate 5%SG Chlorfluazuron 50g/l EC Bistrifluron 100g/l EC Tebufenozide 200g/l SC Chromafenozide 50g/l SC Flubendiamide 24%WG Chlorantraniliprole 200g/l SC Neem seed water extract Azadirachtin 50g/l EC Lufenuron 50g EC Pyridalyl 100g/l SC	**3A** **5** **6** **15** **15** **18** **18** **28** **28** **UN** **UN**	15ml 10ml 4g 10ml 15ml 15ml 20ml 4-5g 1.9ml 400g 20ml 10ml 10ml	480-750ml 320-500ml 160-250g 320-500ml 480-750ml 480-750ml 640-800ml 120g 120-180g 12-18kg 640-800ml 320-500ml 640-800ml	750-900ml 500-600ml 250-300g 500-600ml 750-900ml 750-900ml 800-1200ml 155g 180-240g 18-24kg 800-1200ml 500-600ml 1000-1200ml	07 07 10 10 07 07 07 07 03 07 07 14	Apply insecticides at the first sign of damage and repeat at 2 week intervals if necessary. Count caterpillars weekly in 12 plants at random and spray if the count exceeds 8 DBM or 4 larvae of the caterpillar species. Spot application at early stage of detection is more economical for S.*litura* and C.*binotalis*

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Diamond Backed Moth	Flubendiamide 24%WG Spinosad 25g/l SP Spinotoram	**28** **5**	4-5g 10ml 2.5g	120-200g 320-480ml 80-100g	200-240g 480-600ml 125-150g	07 07	
White grubs, Black cut worm& Root eating ants	Pl.refer general pests						
POTATO							
Potato tuber moth stores	Pirimiphos methyl 500g/l EC Acetamiprid 20%SP Novaluron 100g/l EC	**1B** **4A** **15**	40ml 10ml 10ml	- - -	- - -	- 14 14	Clean all stores well in advance of harvesting potatoes. Walls' floors and storage trays should be cleaned and given a residual spray and air dried before storing tubers.
	Thiocyclam 50%SP Pirimiphos methyl 20g/kg DP	**14** **1B**	40-50g /100kg of seeds (for seed potato) 100g/100kg of seeds			14	Inspect stores on a fortnightly basis. If there is any sign of insect damage apply a recommended insecticide.
Potato tuber moth Field	Chlorantraniliprole20%+Thiamethoxam 20% WG PTM pheromone 0.16%+ Permethrine 6% Thiomethoxam 75G	**28+4A** **4A**	5g 5g	100g	120g	10	When first sign of damage are seen, direct spray to under side of the foliage close to the stem and branches.

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Potato Aphids Thrips Whitefly	Carbosulfan 200g/l SC Thiamethoxam 25%WG Imidacloprid 70%WG Thiocyclam 50%SP Ethiprole 10%SC Chlorantraniliprole20%+ Thiamethoxam20% WG Sulfoxaflor 240 SL Buprofezin 25% SL Thiomethoxam75%SG	**1A** **4A** **4A** **14** **2B** **28+4A** **4C** **16** **4A**	20ml 3g 1.25g 25g 12.5ml 3g 6ml 15ml 1.5 g	640-1000ml 100-150g 40-60g 800-1200g 400-600ml 100g 192ml 480ml 2.5g	1000-1200ml 150-180g 60-75g 1200-1500g 600-750ml 120g 240ml 600ml	14 14 14 14 14 10	Timing of insecticide application is critical. Aphids population on plants should be monitored visually or by placing water traps in the field. Spot application is desirable at initial stage of infestation. Direct spray to the shoot and underside of leaves. In severe infestation, repeat at 10 – 14 days intervals if necessary.
Potato mites	Fenpyroximate 50g/L EC	**21A**		20ml	25ml		
Potato Leaf Miner	Azadirachtin 50g/l EC Neem Seed water Extract Abamectin 18g/l EC	**UN** **UN** **6**	20ml 400g 6ml	640-800ml 12kg 190-240ml	800-1200ml 24kg 240-360ml	14 07 14	
Cyst nematodes	Calcium hypoclorite 70%	**UN**	35g/10m^2	35kg/ha			Apply to furrows (at planting or one day before planting) and cover with soil. Do not mix with inorganic fertilizers.

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
TOMATO							
Tomato fruit borer	Novaluron 100 g/l EC	**15**	10ml	320ml	600ml	14	The first spraying may be done at the time of flowering and formation of fruits and repeat if necessary at 10-14 day intervals.
	Chlorfluazuron 50g/l EC	**15**	15ml	480ml	900ml	10	
	Chloranthraniliprole185g/l SC	**28**	2ml	90ml	130ml	07	
	Spinosad 450g/l SC	**5**	3ml	140ml	220ml	07	
	Flubendiamide 24%WG	**28**	2g	86g	140g	07	
Whiteflies Thrips Aphids	Carbosulfan 200g/l SC[2]	**1A**	20ml	640ml	800ml	14	
	Fipronil 50g/l SC[2]	**2B**	10ml	16ml			
	Thiamethoxam 25%WG	**4A**	3g	320ml	600ml	14	
	Imidacloprid 70%WG	**4A**	1.25g	40g	75g	14	
	Thiocyclam 50%SP	**14**	25g			14	
BEET ROOT							
Beet root leaf Miner	Refer recommendation for Potato Leaf Miner						
BRINJAL							
Brinjal & Thibbatu Shoot & fruit borer	Lamda cyhalothrin	**3A**	-	600ml	825ml	07	Apply at flowering. Continue application at fortnightly intervals after harvesting, if necessary. Repeated application may lead to resistance buildup. destroy all damaged fruits and shoots before applying insecticides.
	Spinosad 450g/l SC	**5**	3ml	100-120ml	150-180ml	07	
	Chromafenozide 50g/l SC	**18**	20ml	640-800ml	1000-1200ml	07	
	Chloranthraniliprole200 g/l SC	**28**	2ml	150ml	210ml	03	
	Flubendiamide 24%WG	**28**	3g	5g			
	Flubendiamide 20%WG	**28**	6g	9.5g			
	Spinotoram 25%WG		3g	5g			
	Etofenprox 100g/l EC		15ml	480-600ml	750-900ml	07	

Crop/ pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Leaf hopper	Acetamiprid 200g/l SL Thiamethoxam 25% WG	**4A** **4A**	10ml 3g	320-400ml 120g	500-600ml -	14 14	
White flies	Buprofesin 10%WP Thiamethoxam 25%WG Imidacloprid 70%WG Thiocyclam 50%SP Chlorantraniliprole20%+ Thiamethoxam20% WG[5] Acetamiprid 200g/l SL	- 4A 4A 14 28+4A 4A	6g 3g 1.25g 25g 2.5g 10ml	190g 120g 60g 800g 240ml	- - - 1000g 480ml	14 14 14 14	
Mites	Hexythiazox 5%EC	10A		600ml	1000ml		
CAPSICUM							
leaf curl complex Aphids Thrips White flies[1]	Ref. recommendation for chili						
Pod borer *Helicoverpa armigera*	Chlorfluazuron 50g/l EC Chloranthraniliprole185g/l SC Spinosad 450g/l SC Novaluron 100g/1EC	**15** **28** **5** **15**	10ml 2ml 3ml 10ml	80ml 130ml 320ml 480ml	130ml 210ml 600ml 900ml	10 03 07 14	

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
CUCURBITS							
Gall fly	Profenofos 500g/l EC[3]	**1B**	30ml	50ml			
Melon fly	Protein bait+ Spinosad 25g/lSC along with IPM Practices	**5**	250ml	1000ml	2000ml	07	Application of protein bait is the major part of IPM practices. 1 Protein bait should be applied in spots on to the underside of the leaves of the vines at 10-15 ft apart. 2. Spraying should be done to wet the underside of leaves. 3. Spraying in the morning before 9.00am is important. 4. Spraying should be initiated with the flowering and continued unit harvest at 7 day intervals 5. Remove the damaged fruits into a black polythene bag, tie the mouth up and keep exposed to the sunlight.

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
OKRA							
Shoot and pod borer	Chlorantraniliprole 20%SC Tebufenozide 200g/l SC Spinosad 450g/l SC	**28** **18** **5**	1.9ml 15ml 3ml	60ml 480-600ml 100-140ml	115ml 750-900ml 140-180ml	10 10 03	Apply from flowering stage if infestation is seen and repeat at fortnightly intervals, if necessary.
Leaf hopper	Acetamiprid 200g/l SL Thiamethoxam 25% WG	**4A** **4A**	10ml 3g	320ml 120g	400ml -	14 14	
White flies	Pl. ref. general pests.						
INNALA							
Root Knot Nematode[1]	Ref general recommendations.						
FRUITS MANGO							
Mango leaf hopper[1]	Imidacloprid 20% SL Thiamethoxam 25% WG	**4A** **4A**	10ml 10g	- -		14 14	Prior to new flush growth spray to colonized areas on the trunk and foliage as spot applications. If necessary, apply at flower initiation and new flush growth

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Mango fruit fly	Protein bait + Spinosad 25g/l SC along with IPM practices	**5**	250ml+ 10ml	1000ml	2000ml	07	Application of protein bait is the major part of IPM practices. 1 Protein bait should be applied in spots on to the underside of the leaves of a lower branch of each tree. 2. Spraying should be done to wet the underside of leaves. 3. Spraying in the morning before 9.00am is important. 4. Spraying should be initiated 1 month after flowering and continued unit harvest at 7 day intervals 5. Remove the damaged fruits into a black polythene bag, tie the mouth up and keep exposed to the sunlight.
Stem borer	Refer general recommendations						

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
PINEAPPLE							
Pineapple mealy bug	Carbosulfan 200g/l SC[2] Acetamiprid 20%SP	1A 4A	30ml 10g	- -	- -	14 14	Dip planting materials in one of the recommended insecticide solutions for 5 minutes. Allow to dry for a day. To prevent crown rot treat with fungicide containing Metalaxyl 18% and Mancozeb 64% and leave to dry for another day before transplanting. At the end of the first harvest, monitor ant/mealy bug incidences. If infestation is seen use the above insecticides at same rate. Direct the spray to the base of the leaves and the crown.
PAPAW							
Papaya Mealybug	IPM + biological control Mineral oil		50ml	1300ml	1600ml	07	Adopt IPM practices for successful controlling of the pest Only if the infestation is heavy and spreading fast, spray Mineral oil at 10-14 day intervals.

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
OTHER FIELD CROPS **MAIZE AND SORGHUM**							
Maize stem borer and Cob borer	Etofenprox 100g/l EC Thiocyclam hydrogen oxalate 4%GR Novaluron 100g/l EC Fipronil 0.3%GR Diazinon 5%GR	**3A** **14** **15** **2B**	15ml -- 10ml	480ml 15kg 320ml 12kg	900ml 600ml	07 14 14 14	Direct spray to central whorl' Apply at 25-35 and at 45-55 days after planting. Place granules in the central whorl. Single application is sufficient.
CHILLI							
Chili leaf curl complex Aphids Thrips White flies	Carbosulfan 200g/l SC Thiamethoxam 25% WG Imidacloprid 20% SL Abamectin 18g/l EC Abamectin 3.6 EW Thiocyclam 50%SP Chlorantraniliprole20%+ Thiamethoxam20% WG Spinosad 45%SC	**1A** **4A** **4A** **6** **6** **14** **28+4A** **5**	30ml 10g 10ml 6ml 3ml 5g 20ml 5ml	960-1200ml 320-400g 320-400ml 190-250ml 100ml 160-200g 100g 200ml	1200-1800ml 400-600g 500-600ml 250-360ml 180ml 200-300g 120g 300ml	14 14 14 07 07 14 10 07	
Chili- mites	Refer general pests						

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Chili Pod borer	Chlorfluazuron 50g/l EC Chlorantraniliprole20%+Thiamethoxam 20% WG Flubendiamnide 240WG	**15** **28+4A** **28**	10ml 2.5g	320-400ml 100g	500-600ml 120g	10 10	
ONION							
Onion thrips	Fipronil 50g/l SC Imidacloprid 200g/l SL Thiacloprid 240g/l SC	**2B** **4A** **4A**	10ml 10ml 10ml	320ml 160ml 320ml	400ml 200ml 400ml	14 14 14	
Onion caterpillar	Emamectin Benzoate 5%SG Chlorfluazuron 50g/l EC Metaflumizone 240g/l EC Lamda cyhalothrin Diazinon 500g/l EW	**6** **15** **22** **3A** **1B**	4g 10ml 25ml 5ml 50ml	130g 320ml 800ml 160ml 1600ml	160g 400ml 1000ml 300ml 2000ml	07 10 14 07 14	
GRAIN LEGUMES							
Pod sucking bugs	Imidacloprid 70%WG Thiocloprid 240g/l SC Dinotefuran 20%WP	**4A** **4A** **4A**	1.5g 10ml 10g	48g 320ml	90g 600ml	14 -	
Sesame-Leaf Webber	NSWE Chlorfluazuron 50g/l EC Tebufenozide 200g/l SC	**UN** **15** **18**	400g 30ml 15ml	12-16kg 960-1200ml 480-600ml	20-24kg 1200-1800ml 600-900ml	07 10 10	
MUSTARD							
Mustard	Refer recommendations for cabbage						

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
GROUND NUT							
Ground nut Leaf miner	Pl .ref. general pests.						
GENERAL PESTS							
Stored product pests	Pirimiphos-Methyl 500g/l SC	**1B**	25ml	40ml			
Snails & slugs	Metaldehyde 3% RB Metaldehyde 4% RB Metaldehyde 6.5% RB			10kg	40kg		15g/10 m^2 Mix with sufficient water to form balls, Place at several points in the garden. Apply in bands between rows or broadcast in soil.
Leaf hopper	Imidacloprid 200g/l SL Acetamiprid 20% SP Imidacloprid 75%WG	**4A** **4A** **4A**	10ml 10g 1.5g	320-400ml 320-400g 60g	500-600ml 500-600g 90g	14 14 14	Direct the spray to the upper & lower surfaces of leaves.
Aphids	Thiamethoxam 25%WG Imidacloprid 70%WG Thiocyclam 50%SP	**4A** **4A** **14**	3g 1.3g 25g	100g 60g 800-1000g	120g 1000-1200g	14 14 14	

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Mealy bugs & Scales	Fipronil 50g/l SC[2]	**2B**	10ml	400ml		14	Remove & destroy damaged plant parts & spray to wet the infested area.
	Thiamethoxam 25%WG	**4A**	5g	160g		14	
	Imidacloprid 70% WG	**4A**	1.3g	60g		14	
	Mineral oil	**UN**	50ml			07	
	Acetamiprid 200g/l SL	4**A**	10g	-	-		
	Imidacloprid 200g/l SL	**4A**	10ml	320-400ml	500-600ml	14	
Whiteflies	Thiamethoxam 25%WG	**4A**	5g	120g		14	Spray early morning when the activity of white flies are low.
	Imidacloprid 70%WG	**4A**	1.5g	60g		14	
	Thiocyclam 50%SP	**14**	25g	800g	1000g	14	
	Acetamiprid 200g/l SL	**4A**	10g			14	
	Imidacloprid 200g/l SL	**4A**	10ml	320-400ml	500-600ml	14	
Thrips	Carbosulfan 200g/l SC	**1A**	20ml	640ml	800ml	14	Apply in the evening as a wet spray.
	Thiamethoxam 25%WG	**4A**	3g	320ml	600ml	14	
	Imidacloprid 70%WG	**4A**	1.25g	40g	75g	14	
	Thiocyclam 50%SP	**14**	25g			14	
	Imidacloprid 200g/l SL	**4A**	10ml	320-400ml	500-600ml	14	
Black cutworm	Etofenprox 100g/l EC	**3A**	15ml	480ml		07	Drench the soil around the base of the plants late in the evening when the damage is observed.
	Chlorfluazuron 50g/l EC	**15**	10ml	320ml		10	
Root eating ants	Diazinon 500g/l EW	**1B**	100ml			14	Apply to soil around plants when damage in observed.
Termites	Imidacloprid 200 g/l SL	**4A**	5ml			14	Apply insecticides to wet the infested area.
	Thiamethoxam 25%WG	**4A**	3g			14	

Crop/ Pest	Common name of the Insecticide	MOA Group	Dilution (ml or g per 10L	Rate of Application (Product ml or g/ ha)		PHI Days	Remarks
				Low foliage	High foliage		
Stem borers and tree borers	Esfenvalerate 7g/l EC Permethrin 250g/l EC Lamda cyhalothrin Imidacloprid 200g/l SL[5] Fipronil 50g/l SC	**3A** **3A** **3A** **4A**				07 07 07 14 14	
Leaf miners	Abamactin 18 g/l EC Neem Seed water extract Azadiractin 50g/l EC	**6** **UN** **UN**	6ml 400g 20ml	240ml		07 07 07	Remove mature lives with pupae.
Mites	Abamactin 18 g/l EC Hexythiazox 10%WP Flufenoxuron 10g/l DC Neem Seed water extract Azadiractin 50g/l EC Fenpyroximate50g/l EC Sufphur 80%WP	**6** **10A** **15** **UN** **UN** **21A** **?**	6ml 5g 15ml 400g 5ml 8ml 80g	300ml 8ml 130g	600ml	07 07 07	Should be sprayed to the underside of the leaves at early infestation stage.
Root knot nematodes	IPM Package						

Mode of Action (MoA) Classification: Ref IRAC 2010

MoA Class	Primary cite of action in insects	Active Ingredients
1. Acetylcholinesterase (AChE) inhibitors- Nerve action	1 A-Carbamates 1B-Organophosphates	Carbosulfan, Fenobucarb Diazinon, Pirimiphos methyl, Profenofos, Acephate
2. GABA-gated chloride channel blockers- Nerve action	2A- Cyclodiene, organochlorines 2B- Phenyl Pyrazoles	Ethiprole, Fipronil
3. Sodium channel modulators- Nerve action	3A- Pyrethroids, pyrethrins 3B- Methoxychlor; DDT	Etofenprox, Lamdacyhalothrin, Esfenvalerate, Permethrin, bifenthrin
4. Nicotinic acetylcholine receptor (nAChR) competitive modulators - Nerve action:	4A-Neonicotinoids 4B-Nicotine 4C- Sulfoxaflor 4D- Butenolides	Thiamethoxam, Imidacloprid, Clothianidin, Denotafuran, Acetamiprid, Thiacloprid Sulfoxaflor
5. Nicotinic acetylcholine receptor (nAChR) allosteric Modulators-Nerve action	Spinosyns	Spinosad. Spinetoram
6. Glutamate gated chloride channel (GluCl) allosteric modulators	Avermectins, Milbemycins	Abamectin, Emamectin benzoate, Milbemectin
7 Juvenile hormone mimics- Growth regulation	7A- Juvenile hormone analogues 7B- Fenoxycarb 7C- Pyriproxyfen	 Pyriproxyfen
8- Miscellaneous nonspecific (multi-site) inhibitors	8A- Alkyl halides 8B- Chloropicrin 8C-Sulfuryl floride 8D- Borates	

	8E- Tartar emetic 8F- Methyl isothiocyanate generators	
9. Modulators of Chordotonal Organs- Nerve action	9B-Pymetrozine 9C- Flonicamid	Pymetrozine
10. Mite growth inhibitors- Growth regulation	10 A- Clofentezine Diflovidazin Hexythiazox 10B- Etoxazole	Hexythiazox
11. Microbial disruptors of insect midgut membranes	11A-Bacillus thuringiensis and the insecticidal proteins they produce 11B Bacillus sphaericus	
12. Inhibitors of mitochondrial ATP synthase Energy metabolism	12A-Diafenthiuron 12B-Organotin miticides 12C-Propargite 12D-Tetradifon	Diafenthiuron
13. Uncouplers of oxidative phosphorylation via disruption of the proton gradient Energy metabolism	Chlorfenapyr DNOC Sulfluramid	
14. Nicotinic acetylcholine receptor (nAChR) channel blockers Nerve action	Nereistoxin analogues	Thocyclam
15. Inhibitors of chitin biosynthesis, type 0 Growth regulation	Benzoylureas	Bistrifluron, Chlorfluazuron, Flufenoxuron, Lufenuron, Novaluron
16 Inhibitors of chitin biosynthesis, type 1 Growth regulation	Buprofezin	Buprofezin
17. Moultin disruptor, Dipteran	Cyromazine	
18. Ecdysone receptor agonists Growth regulation	Diacylhydrazines	Chromafenozide, Methoxyfenozide, Tebufenozide
19. Octopamine receptor agonists Nerve action	Amitraz	
20. Mitochondrial complex III electron transport inhibitors Energy metabolism	20A- Hydramethylnon 20B- Acequinocy 20C- 20C Fluacrypyrim	

21. Mitochondrial complex I electron transport inhibitors Energy metabolism	21A- METI acaricides and insecticides 21B- Rotenone	Fenpyroximate, Pyridaben
22 . Voltage-dependent sodium channel blockers Nerve action	22A- Indoxacarb 22B- Metaflumizone	Indoxacarb Metaflumizone
23. Inhibitors of acetyl CoA carboxylase. Lipid synthesis, growth Regulation	Tetronic and Tetramic acid derivatives	
24. Mitochondrial complex IV electron transport inhibitors Energy metabolism	24A- Phosphine 24B- Cyanides	Aluminium phosphide, Calcium phosphide, Phosphine, Zinc phosphide
25. Mitochondrial complex II electron transport inhibitors Energy metabolism	25A- Beta-ketonitrile derivatives 25B- Carboxanilides	
26/27	Un assigned	
28 Ryanodine receptor modulators Nerve and muscle action	Diamides	Chlorantraniliprole, Cyantraniliprole, Flubendiamide
UN. Compounds of unknown or uncertain MoA	Azadirachtin Benzoximate Bifenazate Bromopropylate Chinomethionat Cryolite Dicofol Pyridalyl Pyrifluquinazon Sulfur Lime sulfur	Azadirachtin Pyridalyl Sulfur

Registered Insecticide List with Trade Names -2015

No	Common Name	Strength	Product Name
1.	abamectin	18g/l EC	Mack Abamectin ,Mitsu Abamectin, Selico Abamectin, CIC Abamectin, Aba Abamectin, CG Abamectin, ICS Abamectin, Baurs Abamectin, Lankem Abemactin
2.	acephate	75% SC	Harthene Acephate, Action Acephate, Nigro Acephate, Surrender Acephate, Oasis Acephate, AgStar Acephate, Asie Acephate, Ceypetco Acephate, Apollo Acephate, CG Acephate
3.	acetamiprid	20% SP	Mospilan Acetamiprid, Azeta Acetamiprid, Miyako Acetamiprid, Rock Acetamiprid
4.	bifenthrin	100 g/l	Biflex 10 TC
5.	buprofezin	10% WP	Applaud 10 WP
6.	carbosulfan	200 g/L SC	Marshal 20 SC
7.	chlorfluazuron	50g/lEC	Atabron 5 EC
8.	chlorantraniliprole	200 g/L SC	Coragen
9.	chromafenozide	50g/l SC	Podex Chromofenozide
10.	Chlorantraniliprole 20% + Thiomethoxam 20%	20+20 % WG	Virtako 40 WG
11.	deltamethrin	25g/l EC	Decis Deltamethrin, Delta Deltamethrin, Delta-M Deltamethrin, Smart Deltamethrin
12.	diazinon	5% GR	Basudin Diazinon, Diodin Diazinon
13.	diazinon	500g/l EC	Kafeer Diazinon, Commet Diazinon, Diazol Diazinon, Diamet Diazinon, Direkter Diazinon, Basudin Diasinon, M-Chem Diazinon, Diazinon 50 EC, Sun Agro Diazinon.
14.	emamectin benzoate	5% w/w SG	Proclaim 05 SG
15.	ethiprole	100g/l SC	Curbix Ethiprole
16.	etofenprox	100g/l EC	Trebon 10 EC
No	**Common Name**	**Strength**	**Product Name**
17.	fenobucarb	500g/l EC	Dozerr Fenobucarb, Bassa Fenobucarb, Hayleys BPMC, CG BPMC, Beepa Fenobucarb,

			Mackcarb BPMC, Dozerr Fenobucarb, Lankem Fenobucarb, Oasis BPMC 50%
18.	fipronil	3%w/w G	ATL Fipronil, Fipronil Keta, Diligent 0.3 GR
19.	fipronil	50g/l SC	Shutter Fipronil, Regent 50 SC, Zees Fipronil, Baurs Fipronil, Grand Fipronil, CG Fipronil, Arrears Fipronil, Fipronil 5%, Viper Fipronil, Arrears Fipronil
20.	fipronil	0.3% GR	Baurs Fipronil, Prince Fipronil
21.	Flubendiamide	240g/kg WG	Belt 240WG
22.	imidacloprid	70% WDG	Rocco Imidacloprid
23.	imidacloprid	70% WG	Admire Imidacloprid, Provado Imidacloprid
24.	imidacloprid	70% WS	Gaucho Imidacloprid
25.	imidacloprid	200g/l SC	Admire Imidacloprid, Sun Agro Imidacloprid, Imidan Imidacloprid, Armour Imidacloprid, Oasis Imidacloprid, Kobra Imidacloprid, Marit Imidacloprid, Dynamic Imidacloprid, Tatamida Imidacloprid, Baurs Imidacloprid, CG Imidacloprid.
26.	indoxacarb	150g/l EC	Auvant
27.	lambda-cyhalothrin	50g/l SC	Metador 5 CS
28.	lufenuron	5% EC	Zagro Lufenuron
29.	metaldehyde	5% GR	CIC Metaldehyde, Metaldehyde 5%G, Baurs Metaldehyde.
30.	methoxyfenozide	240g/l SL	Runner SC 240
31.	monocrotophos	60% SL	Monocrotophos 60 SL
32.	novaluron	100g/l EC	Rimon 10 EC
33.	phenthoate	500g/l EC	SunAgro Phenthoate, SeeSan Phenthoate, Leader Phenthoate, Hayleys Phenthoate, Elsan Phenthoate, Visan Phenthoate, Phenthoate 50 EC
34.	profenofos	500g/l EC	O- Cron Profenophos, Crown Profenofos, Jivro Profenofos, Calcron Profenofos, Hayleys Profenofos, CIC Profenophos, Lankem Profenofos, Kudus Profenophos, Prodan Profenophos, Oasis Profenophos, Baurcron Profenofos, Ceypetco Profenophos, Peron Profenofos, Gemini Profenofos, Harcros Profenofos, CG Profenophos, Grand Profenophos,

			Sun Agro Profenofos, ICS Phenthoate.
35.	quinalphos	250g/l EC	Queen Quinalphos, Sucker Quinalphos, Quick Quinalphos, Quintox quinalphos, Baurs Quinalphos, Kuinal Quinalphos
36.	spinosad	25g/l SC	Success
37.	thiacloprid	240g/l SC	Calypso Thiacloprid
38.	thiamethoxam	70% WS	Cruiser 70 WS
39.	thiamethoxam	25% WG	Actara Thiamethoxam, Opex Thiamethoxam
40.	thiocyclam hydrogen oxalate	50% SC	Evisect S
41.	thiocyclam hydrogen oxalate	4% GR	Thiocyclam Hydrogen Oxalate 4 %G
42.	thiodicarb	375g/l SC	Larvin 375 F
43.	tebufenozide	200g/l SC	Mimic 20 F

FUNGICIDES

Department of Agriculture
Peradeniya
2015

List of recommended fungicides in Sri Lanka

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application low foliage (Product per ha)	Rate of Application high foliage (Product per ha)	Application interval in days (if subsequent applications are required)	PHI (days)	Remarks
Rice	Blast (*Magnaporthe grisea)*	Kasugamycin 20 g/1 SL	D3	15 ml	475-600 ml	750-900 ml	5-10	14	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	
		Isoprothiolane 400 g/l EC	F2	12.5 ml	400-500 ml	625-750 ml	7-10	14	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Tricyclazole 75% WP	I1	6 g	200-250 g	300-350 g	10-14	14	
Rice	Sheath Blight (*Rhizoctonia solani*)	Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	Fungicide spray should be directed to sheaths of the crop.
		Pencycuron 25% WP	B4	20 g	650-800 g	1000-1200 g	7-14	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Rice	Sheath Blight (*Rhizoctonia solani*)	Hexaconazole 50 g/l EC	G1	20 ml	650-800 ml	1000-1200 ml	7-14	21	
		Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	14	
		Propiconazole 250 g/l EC	G1	10 ml	325-400 ml	500-600 ml	7-14	21	
		Flutolanil 50% WP	C2	20 g	650-800 g	1000-1200 g	7-14	14	
All crops (other than rice)	Damping off / Foot rot / Root rot (Pythium spp., Phytophthora spp., Rhizoctonia spp., Sclerotium spp., Fusarium spp)	**For seed treatments:** Captan 50% WP	MSCA	6 g/ kg (Small seeds) 3 g/ kg (Large seeds)					Seed treatment should be done just before seeding.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (other than rice)		Thiram 80% WP	MSCA	5 g/ kg (Small seeds) 2 g/ kg (Large seeds)					
All crops (other than rice)		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	4 g/ kg (Small seeds) 2 g/ kg (Large seeds)					

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (other than rice)	Damping off / Foot rot / Root rot (*Pythium* spp., *Phytophthora* spp., *Rhizoctonia* spp., *Sclerotium* spp., *Fusarium* spp., *Macrophomina* spp.)	**For soil treatments:** Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	Most of the soil borne pathogens can be eliminated by burning and solarisation of nursery beds. Use broad spectrum fungicides such as Captan and Thiram if the causal fungus is not identified. Thiophanate methyl is highly effective on *Fusarium* spp and *Sclerotium rolfsii*. But it is not effective on *Phythium* spp and *Phytophthora* spp.(lower fungy) Soil should be treated with Flutolanil 3 days before seeding. Soil drenching in the field is recommended only as spot application.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (other than rice)	Damping off / Foot rot / Root rot	Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
		Thiophanate-methyl 70% WP	B1	30 g/ 50 l / 10 m^2	-	-	10-12	14	
		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	50 g/ 50 l / 10 m^2	-	-	7-10	14	
		Flutolanil 50% WP	C2	30 g/ 50 l / 10 m^2	-	-	10-12	14	
All crops (other than rice)	Anthracnose (*Colletotrichum spp., Gleosporium spp.*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Propiconazole 250 g/l EC	G1	10 ml	325-400 ml	500-600 ml	7-14	21	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (other than rice)	**Downy mildew** *Peronospora* spp., *Pseudoperonospora* spp	Captan 50% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	12.5 g	400-500 g	625-750 g	12-14	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propamocarb 607 g/l SL	F4	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
All crops (other than rice)	**Powdery mildew** *Sphaerotheca* spp. *Oidiopsis* spp. *Leveillua* spp. *Erysiphe* spp. *Podasphaea* spp	Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	Sulphur containing fungicide are not recommended for cucurbits and can be phytotoxic during hot weather
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	
		Sulphur 80% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Potassium bicarbonate 82% SP	-	15 g	475-600 g	750-900 g	7-10	1	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (other than rice)	**Leaf spot** *Cercospora* spp. *Mycosphaerella* spp. *Alternaria* spp. *Septoria* spp.	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	
		Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	
		Propiconazole 250 g/l EC	G1	10 ml	325-400 ml	500-600 ml	7-14	21	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
All crops (Other than rice)	**Rust** (*Puccinia* spp., *Uromyces* spp)	Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	Sulphur containing fungicide are not recommended for cucurbits and can be phytotoxic during hot weather
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
All crops (Other than rice)	**Rust**	Sulphur 80% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
Beans	**Angular leaf spot** (*Isariopsis griseola*)	Propiconazole 250 g/l EC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	Alternate application of systemic fungicide with contact fungicide is recommended Last application should be done one week before flowering
		Hexaconazole 50 g/l EC	G1	3.5 g	100-150 ml	175-200 ml	7-14	21	
		Hexaconazole 5% SC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	
		Each above followed by Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Beans	**Rust** (*Uromyces appendiculatus*)	Propiconazole 250 g/l EC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	Alternate application of systemic fungicide with contact fungicide is recommended Last application should be done one week before flowering
		Hexaconazole 50 g/l EC	G1	3.5 g	100-150 ml	175-200 ml	7-14	21	
		Hexaconazole 5% SC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	
		Each above followed by Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Beans	**Anthracnose** (*Colletotrichum lindemuthianum*)	Propiconazole 250 g/l EC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	Alternate application of systemic fungicide with contact fungicide is recommended Last application should be done one week before flowering
		Hexaconazole 50 g/l EC	G1	3.5 g	100-150 ml	175-200 ml	7-14	21	
		Hexaconazole 5% SC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	
		Each above followed by Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.

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Cabbage	**Ring spot** (*Mycosphaerella brassicicola*)	Propiconazole 250 g/l EC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	Apply to the entire foliage and repeat if necessary at 3 weeks intervals Strictly adhere to recommended rates to avoid phytotoxicity
		Hexaconazole 50 g/l EC	G1	3.5 g	100-150 ml	175-200 ml	7-14	21	
		Hexaconazole 5% SC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	7-10	21	
		Epoxiconazole 125 g/l SC	G1	3.5 ml	100-150 ml	175-200 ml	7-14	21	
Carrot	**Alternaria blight** (*Alternaria spp*.)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
Chilli / capsicum/ bell pepper	**Foot rot/fungal wilt** (*Sclerotium rolfsii, Fusarium solani*)	Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil as spot application at the appearance of symptoms

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Chilli / capsicum/ bell pepper	**Foot rot/fungal wilt**	Thiophanate-methyl 70% WP	B1	30 g/ 50 l / 10 m^2	-	-	10-12	14	
		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	50 g/ 50 l / 10 m^2	-	-	7-10	14	
Chilli / capsicum/ bell pepper	**Anthracnose** (*Colletotrichum* spp)	Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
		Fluazinam 500 g/l SC	C5	10 ml	325-400 ml	500-600 ml	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Trifloxystrobin 250g + Tebuconazole 500 WG	C3+G1	6 g	200-250 g	300-350 g	10-12	21	
Chilli / capsicum/ bell pepper	**Blossom blight** (*Choanephora* spp)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	

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Chilli / capsicum/ bell pepper	**Leaf mold** *(Fulvia fulva*)	Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	A common disease in protected houses
Chilli / capsicum/ bell pepper	**Powdery mildew** (*Laveillula taurica* - Axeual stage: *Oidiopsis sicula*)	Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
Chilli / capsicum/ bell pepper	**Phytophthora blight** (*Phytophthora capsoci*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	12.5 g	400-500 g	625-750 g	12-14	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	

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Cowpea	**Ashy stem blight** (*Macrophomina phaseolina* (*Rhizoctonia bataticola*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	
Crucifers and cucurbits	**Alternaria blight** (*Alternaria* spp.)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
Cucurbits	**Downy mildew** (*Pseudoperonospora cubensis*)	Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	12.5 g	400-500 g	625-750 g	12-14	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g			10-12	14	Maximum number of applications per season must be limited to three.
		Azoxystrobin 250 g/l SC	C3	10 ml	325-400 ml	500-600 ml	10-12	14	
		Each above followed by either Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Kresoxim-methyl 500g/ l EC	C3	14 ml	450-550 ml	700-840 ml	10-12	14	

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Cucurbits		Captan 50% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
Cucurbits	**Powdery mildew** (*Podosphaera xanthii, Sphaerotheca fuliginea, Erysiphe cichoracearum*)	Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	12.5 g	400-500 g	625-750 g	12-14	14	
		Captan 50% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
		Flutriafol 25% SC	G1	10 ml	320-400 ml	500-600 ml	10-12	14	
		Potassium bicarbonate 82% SP	-	15 g	475-600 g	750-900 g	7-10	1	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
		Azoxystrobin 250g/l SC	C3	10 ml	325-400 ml	500-600 ml	10-12	14	
		Kresoxim-methyl 500g/ l EC	C3	14 ml	450-550 ml	700-840 ml	10-12		
Ginger	**Rhizome rot** (*Pythium* spp.)	Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil as spot application at the appearance of symptoms
		Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	

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Ground nut	**Foot rot/Root rot** (*Sclerotium rolfsii*, *Aspergillus niger*, *Fusarium oxysporum*)	Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil as spot application at the appearance of symptoms
		Thiophanate-methyl 70% WP	B1	30 g/ 50 l / 10 m^2	-	-	10-12	14	
		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	50 g/ 50 l / 10 m^2	-	-	7-10	14	
Onion	**Bulb rot/ Seedling blight** (*Fusarium* spp., *Botrytis* spp., *Sclerotium* spp., *Pythium* spp., *Phytophthora* spp.)	For bulb treatment: Thiram 80% WP	MSCA	15 g	-	-	-	-	Immerse bulbs for 30-60 min in fungicide solution before planting. Fungicide containing Thiram should be applied if the causal fungal pathogen is not identified. Thiophanate-methyl is highly effective on *Fusarium* spp. and *Sclerotium rolfsii*.

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Onion	**Bulb rot/ Seedling blight**	Thiophanate-methyl 70% WP	B1	20 g	-	-	-	-	
		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	18 g	-	-	-	-	
		For soil treatment: Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
Onion	**Anthracnose** (*Colletotrichum gloeosporioides*)	Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	7-14	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-880 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
		Followed by either: Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Fluzinam 500g/l SC	MSCA	10 ml	320-400 ml	500-600 ml	7 - 10	14	

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Onion and Leeks	**Purple blotch** (*Alternaria porri*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended; Tebuconazole could be phytotoxic to leeks
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
		Above fungicides are followed by either: Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Fluzinam 500g/l SC	MSCA	10 ml	320-400 ml	500-600 ml	7 - 10	14	
Okra	**Powdery mildew** (*Erysiphe cichoracearum*)	Sulphur 80% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	

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Okra	**Powdery mildew**	Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
Potato (Seed potato)	**Storage dry rot** (*Fusarium solani*)	Thiophanate-methyl 70% WP	B1	1000 g / mt					Dust seed potatoes after harvest within 10 days before storage.
		Thiophanate-methyl 50% + Thiram 30% WP	B1+MSCA	1000 g / mt					
Potato and Tomato	**Early blight** (*Alternaria solani*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Alternate application of systemic fungicide with contact fungicide is recommended Start spraying after observing first symptoms.
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	25 g	800-1000 g	1250-1500 g	12-14	14	
		Captan 50% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	

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Potato and Tomato	**Early blight**	Mancozeb 60% + Dimethomorph 9% WP	MSCA +F5	50 g	1600-2000 g	2250-3000 g	12-14	14	Maximum number of applications per season must be limited to three.
		Isoprothiolane 400 g/l EC	F2	25 ml	800-1000 ml	1250-1500 ml	7-10	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
Potato and Tomato	**Late blight** (*Phytophthora infestans*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Alternate application of systemic fungicide with contact fungicide is recommended Start spraying after observing first symptoms.
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	25 g	800-1000 g	1250-1500 g	12-14	14	
		Propamocarb 607 g/l SL	F4	30 ml	950-1200 ml	1500-1800 ml	7-10	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Potato and Tomato	**Late blight**	Mancozeb 60% + Dimethomorph 9% WP	MSCA +F5	50 g	1600-2000 g	2250-3000 g	12-14	14	Maximum number of applications per season must be limited to three.
		Isoprothiolane 400 g/l EC	F2	25 ml	800-1000 ml	1250-1500 ml	7-10	14	
		Metiram 55% + Pyraclostrobin 5% WG	MSCA + C3	20 g	650-800 g	1000-1200 g	10-12	14	Maximum number of applications per season must be limited to three.
		Fluazinam 500 g/l SC	C5	10 ml	160-200 ml	250-300 ml	7-10	14	
		Azoxystrobin 250 g/l SC	C3	10 ml	325-400 ml	500-600 ml	10-12	14	
		Valifenalate 6% + Mancozeb 60%	H5+M SCA	20 g	650-800 g	1000-1200 g	10-12	14	
Potato and Tomato	**Foot rot / Root rot** (*Rhizoctonia* spp., *Fusarium* spp.)	Pencycuron 25% WP	B4	100 g/ 50 l / 10 m^2	-	-	-	14	Drench soil as spot application at the appearance of symptoms.
		Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	-	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Fruit crops									
Apple and Pear	**Scab** (Apple: *Venturia inaequalis*, Pear: *Venturia prina*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Followed by: Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
Apple and Pear	**Pink stem disease** (*Nectria cinnabarina*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Followed by: Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
Avocado	**Shoestring root rot** (*Armillaria mellea*)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil around the plant at the appearance of symptoms.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Banana	**Leaf spot** **Sigotoka leaf spots** (*Mycosphaerella musicola*) **Codana leaf spot** (*Codana musae*)	Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	6-8	14	Fungicides are sprayed only during epidemic conditions. Alternate application of systemic fungicide with contact fungicide is recommended
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	10-14	21	
		Isoprothiolane 400 g/l EC	F2	12.5 ml	400-500 ml	625-750 ml	7-10	14	
		Thiophanate-methyl 70% WP	B1	10 g	325-400 g	500-600 g	10-14	21	
		Propiconazole 250 g/l EC	G1	10 ml	325-400 ml	500-600 ml	10-14	14	
		Potassium bicarbonate 82% SP	-	15 g	475-600 g	750-900 g	7-10	1	
		Flutriafol 25% SC	G1	10 ml	320-400 ml	500-600 ml	10-12	14	
		Azoxystrobin 250 g/l SC	C3	10 ml	325-400 ml	500-600 ml	10-12		
Citrus	**Shoestring root rot** (*Armillaria mellea*)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil around the plant at the appearance of symptoms.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Citrus	**Foot rot/ Gummosis** (*Phytophthora parasitica*)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil around the plant at the appearance of symptoms.
Citrus	**Scab** (*Elsinoe fawcetti*)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
Citrus	**Pink stem disease** (*Corticium salmonicolor*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Followed by Copper (Cupric Hydroxide) 37.5% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
Grape	**Shoestring root rot** (*Armillaria mellea*)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	Drench the soil around the plant at the appearance of symptoms.
Guava	**Fruit canker** (*Pestalotiopsis* spp.)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	

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Guava	**Anthracnose / Twig blight** (*Colletotrichum* spp., *Gloeosporium* spp.)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
Papaya	**Foot rot /Root rot /Stem rot** (*Phythium* spp., *Phytophthora* spp)	Chlorothalonil 500g/l SC	MSCA	90 ml/ 50 l / 10 m^2	-	-	7-10	14	Drench around the base of the plant as spot application.
		Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	150 g/ 50 l / 10 m^2	-	-	12-14	14	
Papaya	**Leaf spot** (*Corynespora cassiicola, Asperisporium cariene*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
Pineapple	Heart/stem /root rot (*Phytopthhora* spp)	Copper (Cupric Hydroxide) 37.5% WG	MSCA	250 g/ 50 l / 10 m^2	-	-	6-8	14	Drench soil and plants with fungicide solution.
		Mancozeb 64% + Metalaxyl 8% WP	MSCA +A1	150 g/ 50 l / 10 m^2	-	-	12-16	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Pomegranate	**Cercospora leaf/ fruit spot** (*Cercospora punicae*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Prior to fungicide spraying, prune and clean the diseased plants.
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	
Pomegranate	**Anthracnose** (*Colletotrichum gloeosporioides*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Prior to fungicide spraying, prune and clean the diseased plants.
		Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-12	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-12	14	
Rambutan	**Powdery mildew** (*Oidium* spp.)	Sulphur 80% WG	MSCA	50 g	1600-2000 g	2500-3000 g	14-21	14	Repeat if necessary in 2 weeks.
Strawberry	**Gray mold** (*Botrytis cinerea*)	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Fungicide spraying must be started during flowering stage.
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Strawberry	**Leaf spot** (*Mycosphaerella fragariae*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Followed by: Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
Strawberry	**Leaf blight** (*Phomopsis obscurans Dendrophoma obscurans*)	Tebuconazole 250 g/1 EW	G1	3.5 ml	100-150 ml	175-200 ml	14-21	21	Alternate application of systemic fungicide with contact fungicide is recommended
		Followed by: Propineb 70% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
Strawberry	**Anthracnose** (*Colletotrichum* spp.)	Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Floricultural crops	**Anthracnose** (*Colletotrichum gloeosporioides*, *Glomerella* spp)	Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	Anthracnose is commonly found in anthurium, aglaonema, dieffenbachia, adenium, polyscias, orchids and dracaena plants.
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	
Floricultural crops	**Rust** (*Puccinia* spp., *Uromyces* spp.)	Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	Common in Dracaena, Sandariana, Schefflera, Commelina, Aloe, Chrysanthemum and Canna plants.
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	
		Tebuconazole 250 g/1 EW	G1	6 ml	200-250 ml	300-350 ml	14-21	21	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Floricultural crops	**Leaf spots** *(Alternaria* spp., *Helminthosporium* spp., *Drechslera* spp., *Exserohilum* spp., *Phaetricoconis* spp., *Myrotheciu m* spp., *Cercospora* spp., *Fusarium* spp., *Phyllosticta* spp., *Curvularia* spp., *Phomopsis* spp., *Cylindrocladium* spp.,)	Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	Alternaria leaf spot is common in aglaonema, calathea, schefflera and fatsia plants. Leaf spot is common and major limiting factor in palms (mainly in Livistona rotundifolia, cacti, marantha and calathea). Ensure the proper sanitation along with fungicide application in heavy infection. Myrothecium leaf spot is common In Aglaonema, Diffenbachia, Dracaena, Hedera, Marantha, Peperomia and Philodendron plants.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
	Leaf spots **Yellow blotch** (*Pseudocercospora dendrobi*)	Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	Yellow blotch of P. dendrobi is common in Dendrobium orchids.
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Carbendazim 50% WG	B1	7 g	225-275 g	350-425 g	10-14	14	
		Carbendazim 500 g/1 SC	B1	7 ml	225-275 ml	350-425 ml	10-14	14	
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	
Floricultural crops	**Damping off, Collar rot, Stem rot, Root and Crown rot** *(Phytophthora* spp/, *Phythium,Rhizoctonia* spp., *Sclerotium, Botryodiplodia* spp., *Fusarium, Colletotrichum* spp.)	Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	Anthurium, Dieffenbachia, Dracaena, Roses, Orchids and Peperomia are susceptible to Phytophthora spp. Scindapsus, Philodendron, Canna and Marantha are susceptible to Phythium spp. Thiophante methyl is more effective against Fusarium spp and Sclerotium rolfsii.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Floricultural crops	**Damping off, Collar rot, Stem rot, Root and Crown rot**	Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
		Thiophanate-methyl 70% WP	B1	30 g/ 50 l / 10 m^2	-	-	10-12	14	
		Chlorothalonil 500g/l SC	MSCA	90 ml/ 50 l / 10 m^2	-	-	7-10	14	
Floricultural crops	**Rhizoctonia root rot** (*Rhizoctonia solani*), **Sclerotium root and stem rot** (*Sclerotium rolfsii*)	Thiophanate-methyl 70% WP	B1	30 g/ 50 l / 10 m^2	-	-	10-12	14	Rhizoctonia root rot is common in Aglaonema, Dracaena, Philodendron, Pothos, Syngonium, Schefflers, Codiaeum, Polyscias,Allmanda aln Ixora species. Drecaena, Pothos, Polyscias, Peperomia, Syngonium, Philodendron, Schefflera, Saintpaulia and Dieffenbachia are susceptible to Sclerotium rolfsii.
		Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	
		Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
Floricultural crops	**Fusarium Leaf Spot** (*Fusarium moniliforme*)	Thiophanate-methyl 70% WP	B1	6 g	200-250 g	300-350 g	10-12	14	Dracaena, Acorus and Sansevieria are susceptible to Fusarium leaf spots.

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Floricultural crops	**Fusarium stem rot** (*Fusarium solani*), **Fusarium wilt** (*Fusarium oxysporum)*	Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	Aglaonema, Dieffenbachia and Polyscias are susceptible to stem rot. Fusarium wilt is common in Fatsia and Hedera species.
		Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
Floricultural crops	**Stem and Rhizome rot** (*Aspergillus niger*)	Captan 50% WP	MSCA	60 g/ 50 l / 10 m^2	-	-	6-8	14	Dracaena, Polyscias and Sansevieria are susceptible to this disease. Dip the cut end of the cuttings and drench the soil with fungicide solution.
		Thiram 80% WP	MSCA	70 g/ 50 l / 10 m^2	-	-	6-8	14	
		Chlorothalonil 500g/l SC	MSCA	90 ml/ 50 l / 10 m^2	-	-	7-10	14	

Crop(s)	Name of the Disease / Pathogen	Common Name	Code for Mode of Action / Target Site	Dilution (Product per 10 l of water)	Rate of Application when low foliage (Product per ha)	Rate of Application when high foliage (Product per ha)	Application interval in days (only if subsequent applications are required)	PHI (days)	Remarks
Floricultural crops	**Black spot** (*Diplocarpon rosae*)	Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Roses are more susceptible. Remove and burn infected leaves and stems. Cover the soil surface with fresh soil if infected leaves are fallen and decayed on the soil surface.
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
		Copper (Cupric Hydroxide) 37.5% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
		Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
Floricultural crops	**Botrystis Blight** (*Botrytis cinerea)*	Mancozeb 75% WG	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	Roses are more susceptible.
		Maneb 80% WP	MSCA	20 g	650-800 g	1000-1200 g	7-10	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	
Floricultural crops	**Downy mildew** *(Perenospora* spp)	Captan 50% WP	MSCA	20 g	650-800 g	1000-1200 g	6-8	14	Roses are more susceptible.

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Floricultural crops	**Powdery mildew** (*Sphaerotheca pannosa f.* spp. *rosea*)	Sulphur 80% WG	MSCA	50 g	1600-2000 g	2500-3000 g	6-8	14	
		Chlorothalonil 500g/l SC	MSCA	30 ml	950-1200 ml	1500-1800 ml	7-10	14	

Mode of Action (MoA) Classification:

Mode of action	Target site and code	Group name
A Nucleic Acid Synthesis	**A1:** RNA polymerase 1	PA (PhenylAmides) fungicides
B Mitosis and cell division	**B1:** β tubuline assembly in mitosis	MBC – (Methyl Benzimidazole Carbamates) Fungicides
	B4: Cell division	Phenylureas
C Respiration	**C2:** Complex II: succinate-dehydrogenase	SDHI (Succinate dehydrogenase inhibitors) fungicides / Carboxamides
	C3: Complex III: Cytochrome bc1 (ubiquinoloxidase) at Qo site (*cyt b gene*)	QoI– fungicides (Quinone outside Inhibitors)
	C5: Uncouplers of oxidasive phosphorylation	Aniline fungicides
D Amino acids and protein synthesis	**D3:** protein synthesis	Hexopyranosyl antibiotics
E Signal transduction	**E3:** MAP/Histidine-Kinase in osmotic signal transduction (os – 1 , *Daf1*)	dicarboximides
F Lipids synthesis and membrane integrity	**F2:** Phospolipid biosynthesis, methyltransferase	Phosphorothiolates Dithiolanes
	F4: Cell membrane permeability, fatty acids	Carbamates
G Sterol biosynthesis in membranes	**G1:** C14- demethylase in sterol biosynthesis(*erg11/cyp51*)	DMI – fungicides (De Methylation Inhibitors) (SB1:Class 1)
H Glucan synthesis	**H5: Cellulose synthesis**	CAA fungicides (Carboxylic Acid Amides)
I Melanin synthesis in cell wall	**I1:** Reductase in melanin biosynthesis	MBI-R (Melanin Biosynthesis Inhibitors Reductase)
U Unknown mode of action	**Unknown**	Cyanoacetamideoxime
M Multi- site contact activity ()	**MSCA:** Multi- site contact activity	Inorganic
	MSCA: Multi- site contact activity	dithio- carbamates and relatives
	MSCA: Multi- site contact activity	Phthalimides
	MSCA: Multi- site contact activity	Chloronitriles (phthalonitriles)

Registered Fungicide List with Trade Names 2015

Number	CommonName	Strength	Product Name/Trade Name
1	azoxystrobin	250g/l SC	Amistar 250 SC.
2	bupirimate	250 g/l EC	Nimrod
3	captan	50% WP	Pentagan captan, CG Captan, Captaf Captan, Baurs Captan, Ceypetco Captan, ICS Captan
4	captan	480 g/l	Captagon Captan
5	carbendazim	50% WP	Billet Carbendazim, Oasis Carbendazim, Hayleys Carbendazim, Benzor Carbendazim, Carbin Carbendazim, CG Carbendazim.
6	chlorothalonil	75% WP	Ole Chlorothalonil, Bright Chlorothalonil, Chloro Chlorothalonil, Thaloni Chlorothalonil
7	chlorothalonil	500g/l SC	Ronil Chlorothalonil
8	chlorothalonil	75% SC	Max Chlorothalonil
9	copper (as copper oxychloride)	50% WP	Coblite Copper Oxychloride
10	copper (as cupric hydroxide)	57.6% DP	Champ Copper Hydroxide
11	dimethomorph+ mancozeb	9+ 60 % WP	Acrobat MZ
12	difenoconazole	250g/l EC	Score
13	dimethomorph+ mancozeb	90 +600 g/kg	Baurs Dimethomorph +
14	epoxiconazole	125g/l SC	Opus
15	fenhexamid	500g/l SC	Teldor
16	fluazinam	500g/l SC	Tizca Fluazinam, Nando
17	flutolanil	50% WP	Moncut
18	flutriafol	250g/l SC	PointerFlutriafol, Impact Flutriafol
19	hexaconazole	5% SL	Emzole Hexaconazole, Hiper Hexaconazole

20	hexaconazole	50g/l EC	Hexa Hexaconazole,.Lazer Hexaconazole, Baurs Hexaconazole, Eraser Hexaconazole, Agstar Hexaconazole, Hero Hexaconazole, Eraser Hexaconazole, CIC Hexaconazole,. Emzole Hexaconazole, Hayleys Hexaconazole, Hayleys Hexaconazole
21	iprodione	750g/kg WP	Rovral
22	isoprothiolane	400g/l EC	Fuji-One 40 EC
23	Kresoxim-methyl	500g/l SC	Ergon
24	mancozeb	80% WP	Mancozeb, Hayleys Mancozeb, Right Mancozeb, AgStar Mancozeb, Mancozeb 80% WP Jumbo Mancozeb, Lankem Mencozeb, Farmers Mancozeb, Dynamic Mancozeb, Ceypetco Mancozeb, Samit Mancozeb, CIC Mancozeb, Dizeb Mancozeb, Dithane Mancozeb, Mackzeb Mancozeb, SunAgro Mancozeb, Unipower Mancozeb, Grand Mancozeb.
25	mancozeb	75% WG	Zeero Mancozeb
26	mancozeb	75% DF	Baurs Mancozeb
27	mancozeb + metalaxyl	64+8 % WP	Ridol Metalaxyl+, CIC Mancozeb +, Mancozeb+Metalaxyl
28	mancozeb + metalaxyl	64+8 % WP	Laxy Mancozeb+,Metalaxyl Ridoaxyl Metalaxyl +, Rid-All Mancozeb +
29	M- Metalaxyl + Mancozeb	4+64 % WSG	RedomilGold Metalaxyl +
30	maneb	80% WP	Mannar Maneb, Baurs Maneb
31	metiram	70% WP	BASF Metiram.
32	metriram + pyraclostrobin	55+5 % WG	Baurs Pyraclostrobin +, Cabrio Top Pyraclostrobin +
33	potassium bicarbonate.	82% WSP	Kaligreen
34	pencycuron	25%WP	Monceren WP 25%
35	potassium bicarbonate.	82% WSP	Keligreen
36	propamocarb	607g/l SL	Previcur 607 SL
37	propiconazole	250g/l EC	Sira Propiconazole, Lankem Propiconasole, Oasis Propiconazol, Bumper

			Propiconazole
38	propineb	70% WP	Protocol Propineb, Trazol Propineb, Trazol Propineb, Trazol Propineb, Trazo Propineb, Antracol Propineb
39	sulphur	80% WDG	Vitasul Sulphur, Kumulus Sulphur, Sulmite Sulphur, Baurs Sulphur, CG Sulphur,
40	sulphur	80% WP	Mitex Sulphur, Cosavet Sulphur
41	tar acids	6-12% SC	Brunolium Plantarium
42	tebuconazole	250g/l EW	Folicur tebuconazole, Lankem Tebuconazole, Orius Tebuconazole
43	thiophanate-methyl	70% WP	Morison Thiophanate Methyl.
44	thiophanate-methyl + thiram	50+30 % WP	Homai
45	thiram	80% WP	Oasis Thiram Plantchem, Thiram CG Thiram, Scope Thiram.
46	tricyclazole	75% WP	Guru
47	tryfloxystrobin + tebuconazole	250+500g/kg WG	Nativo 75 WG
48	metham	423g/l SL	Metham

HERBICIDES

Department of Agriculture
Peradeniya
2015

HERBICIDE RECOMMENDATIONS – 2015

CROP: RICE
POST PLANTING HERBICIDES FOR GRASSES, SEDGES & BROAD-LEAF WEEDS

Common name of the Herbicide	Effective Weeds	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Pretilachlor 300 g/l EC	Common annual grasses, sedges & broad-leaf weeds including *Echinochloa* spp. *Ischaemum rugosum* *Leptochloa chinensis* *Cyperus difformis* *Cyperus iria* *Fimbristylis* spp. *Ludwigia* spp. *Eclipta alba*	cell division inhibitor Inhibition of VLCFAs (see Remarks) (Inhibition of cell division	40-50ml	64-80 ml	1.6 l	0-4 DAS/DAP	Apply on to wet/moist soil. Proper land levelling is important. Maintains residual effect for 2-3 weeks. Safener, fenchlorim, is added to protect rice seedling from the herbicide injury.
Oxyfluorfen 240 g/l EC		inhibits the production of a chlorophyll enzyme which results in an accumulation of chemicals that disrupt cell membrane integrity in the presence of light. Inhibition of protoporphyrinogen oxidase (PPO)	2.5ml	4 ml	500 ml	3-5 DAS/DAP	Apply as sand mix (about 60kg of sand/ha) Apply on wet /moist soil. Proper land levelling and water management is important.

Common name of the Herbicide	Effective Weeds	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Pyrazosulfuron-ethyl 10% WP	Common annual grasses, sedges & broad-leaf weeds including *Echinochloa* spp. *Ischaemum rugosum Cyperus difformis, Cyperus iria Fimbristylis* spp., *Eclipta alba* But excluding, *Isachne globosa Leptochloa chinensis*		5.6-7.0 g	8.96-11.2 g	225 g	3-7 DAS/DAP	Apply on drained soil. Residual action lasts 2-3 weeks.
Bispyribac-sodium 100 g/l SC		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	7.5 - 10ml	12-16 ml	300 ml	Weeds are at 2-5 leaf stage (8-14 DAS/DAP)	Drain thoroughly to expose weeds. Always mix with the non-ionic surfactant at 1ml/1000ml of spray mixture. Impound water after 2-3 days of spraying. No residual effect.
Bispyribac sodium 20% wp		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase	7.5-10ml	12-16 ml	300 ml	Weeds are at 2-5 leaf stage (8-14 DAS/DAP)	
Bispyribac-sodium 15 g/l + Thiobencarb 900 g/l OD		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)+Inhibition of lipid synthesis - not ACCase inhibition	38-48 ml	60.8-76.8 ml	1.5 l	7-14 DAS/DAP	

Common name of the Herbicide	Effective Weeds	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Bispyribac sodium 40 g/l+ Metamifop 100g/l SC	Annual Grasses, Sedges & Broad leaves	Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase +ACCase inhibitor, causes chlorosis leading to growth retardation	15.6-20ml	25 - 32 ml	625 ml	Weeds are at 2-5 leaf stage (8-14 DAS/DAP)	
Penoxulam 240 g/l SC	Common annual grasses, sedges & broad-leaf weeds including *Echinochloa* spp. *Ischaemum rugosum* *Cyperus difformis*, *Cyperus iria* *Fimbristylis* spp., *Eclipta alba* But excluding, *Isachne globosa* *Leptochloa chinensis*	Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS	2.5-3.2 ml	4-5.12 ml	100 ml	10-18 DAS/DAP	
Azimsulfuron 50% WG		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	1.5-1.9 g	2.4-3.04 g	60 g	7-15 DAS/DAP	Apply on drained soil. Residual action lasts 2-3 weeks.
Pyribenzoxim 50 g/l EC		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	12.5-16 ml	20-25.6 ml	500 ml	7-18 DAS/DAP	

Common name of the Herbicide	Effective Weeds	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Fenoxaprop-*p*-ethyl 69 g/l + Ethoxysulfuron 20 g/l OD		Inhibition of acetyl CoA carboxylase (ACCase)+Inhibition of acetolactate synthase ALS	12.5 – 16ml	20-25.6 ml	500 ml	14-21 DAS/DAP	Apply on drained soil. Residual action lasts 2-3 weeks.
Pretilachlor 300 g/l + Pyribenzoxim 20 g/l EC	Common annual grasses, sedges & broad-leaf weeds including *Leptochloa chinensis Ischaemum rugosum Echinochloa* spp. *Eclipta alba Cyperus difformis, Cyperus iria, Fimbristylis* spp., *Ludwigia spp.*	cell division inhibitor +Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase	30-40ml	48-64 ml	1.25 l	6-10 DAS/DAP	Apply on drained soil. Residual action lasts 2-3 weeks.
Flucetosulfuron 10% W/W WG	Annual Grasses, Sedges & Broad leaves	inhibited acetolactate synthase (ALS)	5g	8g	200g	Weeds are at 2-5 leaf stage (8-14 DAS/DAP)	

Common name of the Herbicide	Effective Weeds	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Propyrisulfuron 10% SC	Annual Grasses, Sedges & Broad leaves	ALS inhibitor	15.6 ml	25 ml	500ml	Weeds are at 2-5 leaf stage (8-14 DAS/DAP)	

CROP: RICE - POST PLANTING SELECTIVE WEED CONTROL – GRASS KILLERS

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Cyhalofop-butyl 100g/l EC	Mainly annual grasses including *Echinochloa* spp. *Ischaemum rugosum* & *Leptochloa chinensis*	Inhibition of acetyl CoA carboxylase (ACCase)	50-64 ml	80-102.4 ml	2.0 l	2-3 leaf stage of annual grasses (7-15 DAS/DAP)	Apply on to wet soil or with little standing water.

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Quinclorac 250g/l SC		Action like indole acetic acid (synthetic auxins)	20-25ml	32-40 ml	800 ml	3-5 leaf stage of annual grasses (8-15 DAS/DAP)	Apply on the wet soil. Irrigate 1-3 days after application. Residual action lasts 3-4 weeks. Quinclorac should not be applied if succeeding crop belongs to Solanaceae family.
Fenoxaprop-*p*-ethyl 75 g/l EW	Mainly annual grasses, excluding *I. rugosum*	Inhibition of acetyl CoA carboxylase (ACCase)	9-11ml	14.4-17.6 ml	350 ml	16-25 DAS/DAP	Drain the field thoroughly to expose weeds. No residual effect. Absorb quickly (within1-2 h) by weeds. Kills even 2-3 week old grasses. Very effective on *Echinochloa spp.*
Metamifos 10% EC	Annual Grasses	ACCase inhibitor, causes chlorosis leading to growth retardation	33 ml	52.8ml	1250 ml	7-21 DAS/DAP	

CROP: RICE – POST PLANTING SELECTIVE WEED CONTROL BROAD LEAF & SEDGES

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Carfentrazone-ethyl 240 g/l EC	Annual broad-leaf weeds and sedges Including – *Cyperus difformis* *Cyperus iria* *Fimbristylis* spp. *Eclipta alba* *Ludwigia* spp.	Inhibition of protoporphyrinogen oxidase (PPO)	3-3.8 ml	4.8-6.08 ml	120 ml	14-21 DAS/DAP	
Cyclosulfamuron 10% WP			6.3-7.8 g	10.08-12.48 g	250 g	12-21 DAS/DAP	
Ethoxysulfuron 15% WG		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	2-2.5 g	3.2-14 g	80 g	14-21 DAS/DAP	
Bensulfuron-methyl 8.25% + Metsulfuron-methyl 1.75% WP		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase	6.3 – 7.8 g	10.08-12.48 g	250 g	12-21 DAS/DAP	

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
MCPA 400 g/l SL		Action like indole acetic acid (synthetic auxins)	70 – 88 ml	112-140.08 ml	2.8 l	18-21 DAS/DAP	
Orthosulfamuron 50% WG			3.8 - 4.7 g	6.08-7.52 g	150 g	15 DAS/DAP	
MCPA 600 g/l SL	Annual broad-leaf weeds and sedges Including – *Cyperus difformis* *Cyperus iria* *Fimbristylis* spp. *Eclipta alba* *Ludwigia* spp.	Action like indole acetic acid (synthetic auxins)	45-56 ml	72-89.6 ml	1.8 l	18-21 DAS/DAP	
Flucetosulfuron 10% WG			6.3 - 7.8 g	10.08-12.48 g	250 g	12-18 DAS/DAP	
Glufosinate ammonium 150 g/l EC	Weedy Rice	Inhibition of glutamine synthetase	100 ml	160 ml	200-400 ml		Apply to panicles of weedy rice at heading stage
Pretilachlor 300 g/l EC		cell division inhibitor	40-50 ml	64-80 ml	1.3-1.6 l	3 DBS/ DAS/DAP	Apply to the wet moisture soil.

***DAS = Days After Sowing * DAP =Days After Planting**

CROPS: SOYBEAN, BLACK GRAM, GREEN GRAM & COWPEA

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Metribuzin 70% WP/WG	Common weeds including *Digitaria sanguinalis* *Echinochloa* spp. *Eleusine indica Lolium* spp. *Cleome* spp. *Portulaca oleracea* *Ageratum conizoides* *Digitaria* spp.		25-32 g	40-51.2 g	1.0 kg	Apply pre-emergence after planting	

CROPS: BIG ONION & RED ONION

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Oxyfluorfen 240 g/l EC		Inhibition of protoporphyrinogen oxidase (PPO)	12.5 – 16 ml	20-25.6 ml	500 ml	From 2-12 days after planting	
Pendimethalin 300 g/l EC		Microtubule assembly inhibition	88 - 110 ml	140.8-176 ml	3.5 l	From 0-5 days after planting	
Oxyfluorfen 480g/l SC	Sedges. Broad leaves, Annual grasses	Inhibition of protoporphyrinogen oxidase (PPO)	7.5 ml	12ml	300ml	From 0-5 days after planting	

CROP – MAIZE

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Pendimethalin 300 g/l EC	Common weeds including – *Sida acuta* *Amaranthus* spp. *Cleome* spp. *Digitaria* spp. *Echinochloa* spp. *Setaria* Spp *Eleusine indica,*		88 - 110 ml	140.8-176 ml	3.5 l	Apply pre-emergence after seeding	
Topramezone 336g/l SC	Annual grasses, Broad leaves, sedges	inhibits the plant enzyme 4-hydroxyphenylpyruvate dioxygenase (HPPD).	25 ml	40ml	100ml		

CROP - POTATO

Metribuzin 70% WP/WG	Common weeds including *Digitaria sanguinalis* *Eleusine indica, Lolium* spp. *Galinsoga parviflora, Amaranthus* spp. *Polygonum* spp. *Portulaca oleracea* *Solanum nigrum*		25 -32 g	40-51.2 g	1.0 kg	1-6 DAP	

CROP – CARROT

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Metribuzin 70% WP/WG	Common weeds including – *Digitaria sanguinalis* *Echinochloa* spp. *Eleusine indica, Lolium* spp. *Amaranthus* spp. *Portulaca oleracea* *Solanum nigrum* *Galinsoga parviflora* *Polygonum* spp.	Inhibition of photosynthesis at photosystem II	12 - 16 g	19.2-25.6 g	500 g	Apply as a Pre-emergent	

CROP – PINEAPPLE

Diuron 80% WP	All herbaceous weeds	Inhibition of photosynthesis at photosystem II	80 - 100 g	128-160	3.2 kg	Pre-emergence & early post-emergence	
Diuron 480g/l SC		Inhibition of photosynthesis at photosystem II	45-56 ml	72-67.2 ml	1.8L	Pre-emergence & early post-emergence	
Diuron 500g/l SC	Herbaceous weeds	Inhibition of photosynthesis at photosystem II	45 ml	72ml		Pre-emergence & early post-emergence	

CROP – TEA

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Diuron 80% WP	Herbaceous weeds	Inhibition of photosynthesis at photosystem II	22g	35.2g	1.2 kg	Pre-emergence & early post-emergence	

CROP – SUGARCANE

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Diuron 80% WP	Herbaceous weeds	Inhibition of photosynthesis at photosystem II	60-80g	96-128g	3-4 kg	Pre-emergence & early post-emergence	

CROP – RUBBER, COCONUT & RAILWAY ROAD SIDE

Common name of the Herbicide	Purpose of Use - Weed Control	Mode of Action	Dilution Rate		Rate of Application (Product / ha)	Time of Application	Remarks
			10L	16L			
Diuron 80% WP	Herbaceous weeds	Inhibition of photosynthesis at photosystem II	80g	128g	4 kg	Pre-emergence & early post-emergence	

***DAS = Days After Sowing * DAP =Days After Planting**

Registered Herbicicdes List with Trade Names - 2015

Number	CommonName	Strength	Product Name
1.	ametryn + trifloxysulfuron-sodium	73.1+ 1.8 %	Krismat 75 WG
2.	azimsulfuron	50% WG	Gulliver
3.	bensulfuron-methyl + metsulfuron-methyl	8.25+1.75% WP	Sindax 10 WP
4.	bispyribac sodium 40g/l + metamipof 100g/l	40+100 g/l SE	Kiseki
5.	bispyribac-sodium	20% SC	Paddy Gold Bispyribac Sodium, Kensolo Bispyribac Sodium
6.	bispyribac-sodium	100g/l SC	Mikasa Bispyribac Sodium, Omega Bispyribac Sodium, Weego Bispyribac Sodium, Nominee Bispyribac-Sodium
7.	carfentrazone-ethyl	240g/l EC	Affinity
8.	cyhalofop-butyl	100g/l EC	Clincher
9.	diuron	80%WP	Oasis diuron, Ducron Diuron, Hayleys Diuron, Ceypetco Diuron, Unipower Diuron, Lankem Diuron, Agstar Diuron, CIC Diuron, Mackwoods Diuron, Viron Diuron, Plantchem Diuron, Baurs Diuron, ICS Diuron
10.	diuron	500g/l SL	Liquido Diuron
11.	fenoxaprop-p-ethyl	69g/l EC	Ricestar fenoxaprop ethyl
12.	fenoxaprop-p-ethyl	75g/l EW	Whip Fenoxaprop- p- ethyl, Tara Fenoxaprop-p-ethyl, Whip Super Fenoxaprop-p-ethyl, Rip Fenoxaprop Ethyl
13.	fenoxaprop-p-ethyl + ethoxysulfuron	69+ 20g/l OD	TillerGold fenoxaprop ethyl +, TillerGold fenoxaprop-p-ethyl +, Ricestarxtra Fenoxaprop ethyl +
14.	flucetosulfuron	10% WG	Salfi Flucetosulfuron, Fluto Flucetosulfuron
15.	glufosinate ammonium	150g/l EC	Basta
16.	MCPA	400g/l SL	Baurs M.C.P.A.40, Harcros MCPA 40, Hayleys MCPA 40, Agroxone MCPA 40, Sun Agro MCPA 40, Plantchem MCPA 40, CIC MCPA 40

Number	CommonName	Strength	Product Name
17.	MCPA	600g/l SL	ICS MCPA 60, Mackwoods MCPA, Morale MCPA 60, Magic MCPA, Baurs MCPA 60, Morice MCPA, Lankem M-50, CIC MCPA 60, Harcros M.C.P.A. 60, Plan`z tchem MCPA, Hayleys MCPA 60
18.	MCPA	95% Technical.	MCPA Tech
19.	metamifop	10% EC	Matari
20.	metribuzin	70% WDG	Oasis Metribuzin
21.	metribuzin	70% WP	Sencor Metrubuzin
22.	orthosulfamuron	50% WG	Strada Orthosulfamuron
23.	oxyfluorfen	240g/l EC	OxyGuard Oxyfluorfen, Goal Oxyfluorfen, Gallop Oxyfluorfen, Oxo Oxyfluorfen, Osilo Oxyfluorfen, Galigan Oxyfluorfen, Kitto Oxyfuluorfen, Sonic Oxyfluorfen
24.	pendimethalin	300g/l EC	Rower Pendimethalin, Stomp Pendimethalin
25.	pretilachlor	30% EC	Clear Pretilachlor, Baurs Pretilachlor, Sofit Pretilachlor, Set Pretilachlor, Solid Pretilachlor
26.	pretilachlor + pyribenzoxim	300+20 g/l EC	Solito
27.	propyrisulfuron	10% SC	Sumo
28.	pyrazosulfuron-ethyl	10% WP	Pyrazosulfuron Ethyl, Saathi Pyrosulfuronethyl, Riseen Pyrazosulfuron- Ethyl, Sirius Pyrazosulfuron ethyl
29.	pyribenzoxim	5% EC	Pyanchor
30.	quinclorac	250g/l SC	Focus Quinclorac, Facet Quinclorac, Baurs Quinclorac
31.	thiobencarb + bispyribac-sodium	900+15g/l OD	Solo
32.	topramezone	336g/l SC	Clio