PESTICIDES RECOMMENDED FOR USE ON TOBACCO IN MALAWI 2023/2024

Angular Leaf Spot

Tobacco Aphids

Leaf Miners

Clean Tobacco Field

INTRODUCTION

Tobacco production is not different from other crops and despite the best planning and proactive efforts of the grower, it is still prone to attack from insect pests and diseases. Therefore it is necessary to employ appropriate and good agricultural practice and compliant measures to protect the crop to secure desired yield and quality. Crop Protection Agents (CPAs), have an important role in the context of integrated pest management and sustainable tobacco production (STP). CPAs are substances, or mixtures of substances of chemical or biological ingredients, intended for repelling, destroying or controlling any pest or for regulating plant growth. Integrated pest management (IPM) practices reduce CPAs use, improve profitability and protect the crop and the environment. CPAs are classified as: Fungicides, bactericides, insecticides, miticides, nematicides and moluscisides. Fumigants are used to control soil borne pests and diseases and storage pests. Herbicides are used for controlling weeds that compete with the crop and harbour pests. Growth regulators such as suckercides controlling sucker growth and pheromones for attracting pests and repellents to repel them.

Field Scouting

Another principle within IPM and STP is crop surveillance/scouting to enable pest problems to be detected early before they cause severe damage. Scouting allows growers to make informed decisions based on economic circumstances and identify and protect beneficial insects already within the crop which may naturally aid to control and reduce the pest population. However, when conditions demand that CPAs should be used to defend against crop failure, only recommended agrochemicals should be used as per label claims to lessen environmental impact, lower CPA usage and protect pesticide handlers. Always take note that “a well timed pesticide application is very effective than several routinely applied pesticides”.

Herein you will find a list of CPAs RECOMMENDED by the Agricultural Research and Extension Trust (ARET) for controlling important insect pests, diseases and weeds of tobacco. It also contains CPAs prohibited for use on tobacco. The recommended CPAs are based on trials conducted by ARET in collaboration with chemical suppliers. In addition, they are in line with current international codes of practice, relevant CORESTA technical guides and take into account the status of CPAs in the major international tobacco markets. ARET updates and publishes this list annually. The recommendations are aimed at all stakeholders in the tobacco leaf production and supply sectors, including decision-makers, managers, agronomists, pest control specialists, extension officers, leaf technicians and farmers.

A. TOBACCO INSECT PESTS AND CHEMICAL CONTROL

1. APHIDS

Tobacco aphids, also known as the green peach aphids, are a serious insect pest of tobacco in Malawi. Aphids settle on the tobacco plant, particularly on the underside of leaves, suck plant sap and transmit diseases.

Insecticide name	**Active ingredient**	**Mixture Rate in 10 *l* Water**	**Product Rate/Ha**	**Method and timing of application**
Confidor 70 WG	Imidacloprid	1.5 g - nursery 6.5 g - lands	60 g 300 g	Drench 2 l of mixture per m2 at sowing followed by another drench 45 days after germination Apply 30 *ml* (cup No. 30) of mixture in the transplanting water (planting hole) at transplanting
Bandit 350 SC	Imidacloprid	7.2 *ml* - lands	300 *ml*	Apply cup no. 30 at transplanting
Acetamark 20 SP	Acetamiprid	3 g - lands	100 - 400 g	Spray starting 2 weeks after transplanting. One to two additional applications could be made based on scouting
Sivanto 200 SL	Flupyradifurone	9 *ml* - lands	0.4 *l*	Apply as a spray in the field starting two to three weeks after transplanting and repeat fortnightly based on scouting results
Thiamex 25 WG	Thiamethoxam	12.5 g - lands	500 g	Apply as a spray in the field starting two to three weeks after transplanting and repeat fortnightly based on scouting results
Aryna 46 EC	Acetamiprid + Indoxacarb	33.3 *ml* - lands 10 *ml* - nursery	4 *l*	Apply the mixture at transplanting as a drench using 30ml in the transplanting hole, follow up with spray at 4 weeks later Apply the mixture as a drench at sowing using a watering cane, follow up with a pray application at four weeks after germination and continue at 14-21 days interval based on scouting results

2. ANTS

Ants are one of the primary pests found on newly sown seedbeds. They carry away the tobacco seed from the seedbeds and their damage reduces seed germination.

Insecticide	**Active ingredient**	**Mixture Rate in 10*l* Water**	**Product Rate/Ha**	**Method and timing of application**
Decis Forte 10 EC	Deltamethrin	1 *ml* - nursery	0.045 *l*	Drench 1*l* of mixture per m^2 after sowing followed by fortnightly drenches for four times
Lambda 5EC	Lambda-Cyhalothrin	5 *ml* - nursery	0.5 *l*	Drench 2*l* of mixture per m^2 at sowing followed by fortnight drenches after seedling Emergence for four times.
Muthambozi 100 EC	Indoxacarb 80 g + Emamectin 20 g	4 *ml* - nursery	0.1 *l*	Apply the mixture as a drench at sowing using a watering cane, follow up with a pray application at four weeks after germination and continue at 14-21 days interval based on scouting results

3. BUDWORMS

Budworms feed on young tobacco leaves, especially at the bud where they chew the leaves and create holes. The holes are magnified as the leaves grow giving the plants a ragged appearance.

Insecticide	**Active ingredient**	**Mixture Rate in 10 *l* Water**	**Product Rate/Ha**	**Method and timing of application** *(not advisable to apply chemicals after topping to avoid chemical residues)*
Belt 480 SC	Flubendiamide	1.3 *ml* - lands	0.3 *l*	Spray starting two weeks after transplanting and repeat fortnightly based on scouting results
Steward 150 EC	Indoxacarb	7 *ml* - lands	0.3 - 0.6 *l*	Spray starting two weeks after transplanting tobacco. Up to a maximum of 2 applications can be made per season based on scouting
Denim Fit 45 WG	Emamectin +Lufenuron	8 g - lands	336 g	Spray starting two weeks based on scouting
Prevathon 5 SC	Chlorantraniliprol	Split application of 40 *ml* at planting followed by 14 *ml* at 4 weeks after transplanting	2.4 *l*	Dilute 40 *ml* of Prevathon in 10 liters of water and apply cup No.30 to each planting hole at Transplanting. After 4 weeks, dilute 14 *ml* of chemical in 10 liters water and spray to the leaves
Belt Expert 480 SC	Flubendiamide 24%+Thiacloprid 24%	1 *ml* - nursery 2 *ml* - lands	0.1 *l*	Drench 2*l* of mixture per m^2 at sowing followed by fortnight drenches after seedling emergence for four times Foliar application at 2 and 4 weeks after transplanting
Aryna 46 EC	Acetamiprid + Indoxacarb	33.3 *ml* - lands	4*l*	Apply the mixture at transplanting as a drench using 30 *ml* in the transplanting hole, follow up with spray at 4 weeks later using a knapsack sprayer

4. CUTWORMS

Cutworms are brownish – grey soft bodied caterpillars about 2 – 4 cm long. They are more active and prefer feeding at night, cutting stems of seedlings at the nursery or newly transplanted seedlings in the lands.

Insecticide	**Active ingredient**	**Mixture Rate in 10 *l* Water**	**Product Rate/Ha**	**Method and timing of application** *(not advisable to apply chemicals after topping to avoid chemical residues)*
Lambda EC	Lambda - Cyhalothrin	5 *ml* - nursery	0.5 *l*	Drench 2 *l* of mixture per m^2 after seedling emergence followed by fortnight drenches for four times
Muthambozi 100 EC	Indoxacarb 80 g + Emamectin 20 g	4 *ml* - nursery	0.4 *l*	Apply the mixture as a drench at sowing using a watering cane, follow up with a pray application at four weeks after germination and continue at 14-21 days interval based on scouting results
Decis Forte 10 EC	Deltamethrin	1 *ml*	0.045 *l*	Drench 1 l of mixture per m^2 after seedling emergence followed by fortnight drenches for four times
Karate 5 EC	Lambda-cyhalothrin	5 *ml* - lands	0.2 - 0.4 *l*	If land has prior history of cutworms – apply 30 ml of mixture in the transplanting water at transplanting
Belt Expert 480 SC	Flubendiamide 24%+Thiacloprid 24%	1 *ml* - nursery 2 *ml* - lands	0.1 *l*	Drench 2 *l* of mixture per m^2 at sowing followed by fortnight drenches after seedling emergence for four times Foliar application at 2 and 4 weeks after transplanting

5. GRASSHOPPERS

Grasshoppers are incidental pests and include common grasshoppers, green grasshoppers (Bwamnoni) and elegant grasshoppers (Nunkhadala). Insecticides recommended for control of cutworms and budworms in the seedbeds and lands will also control grasshoppers.

6. STINK BUGS

Stink bugs are green or brown colored insects, shield shaped on the back of wings. Stink bugs cause damage by sucking sap on young leaves. Affected leaves wilt very rapidly, especially during hot days. Spray applications recommended for tobacco aphids will control stink bugs.

7. TERMITES

Termites are usually pale-bodied, about 4-6 mm long with brown heads and normally feed on dead organic matter, or on sickly plants, but in some circumstances they may attack growing plants including tobacco. Termites can be a problem both in the nurseries and lands, especially when there is lack of decomposed plant material. Seedlings of young transplants are eaten just at the base of the stems.

Insecticide	**Active ingredient**	**Mixture Rate in 10 *l* Water**	**Product Rate/Ha**	**Method and timing of application** *(not advisable to apply chemicals after topping to avoid chemical residues)*
Confidor 70 WG	Imidacloprid	1.5g - nursery 6.5 g - lands	60 g 300 g	Drench 2*l* of mixture per m² of at sowing followed by another drench 45 days after germination Apply 30 *ml* of mixture in the transplanting water (planting hole) or at base of plant at transplanting only.
Belt Expert 480 SC	Flubendiamide 24%+Thiacloprid 24%	1 *ml* - nursery	0. 1*l*	Drench 2*l* of mixture per m² at sowing followed by fortnight drenches after seedling emergence for four times

8. WIREWORMS

These are hard-bodied, yellow to brown, shiny, smooth and slender wire like worms living in the soil. Wireworms are common in late ploughed lands with undecomposed plant material. Wireworms feed on seed and newly germinated seedlings in seedbeds and newly transplanted seedlings in the lands.

Insecticide	**Active ingredient**	**Mixture Rate in 10 *l* Water**	**Product Rate/Ha**	**Method and timing of application**
Karate 5 EC	Lambda-cyhalothrin	5 *ml* - lands	0.2 - 0.4 *l*	If land has prior history of cutworms – apply 30 *ml* of mixture in the transplanting water at transplanting

9. TOBACCO BEETLE

This is a serious insect pest of stored and cured and stored tobacco. Damage is in form of tunnels in batches of tobacco prominently at the butts. Both the adult and the larvae cause damage to tobacco.

Insecticide	Active ingredient	Mixture Rate	Product Rate/Ha	Application timing and use restrictions
Cislin 2.5 SC	Deltamethrin	12 *ml* 10L water		Spray 5 *l* of mixture per 100 m² to empty tobacco sheds before bringing in new crop
Carifend Net	Impregnated with Alpha-Cyperme-thrin			Cover cured tobacco in storage. Make sure that tobacco is free from any infestation before covering
CHEMICAL UNDER RESTRICTED USE *(This chemical must be applied by registered fumigators only)*				
Phostoxin 56%	Aluminium Phosphide	1.5 g/ m³		Infested tobacco leaf in storage. Keep under airtight sheet for 5-8 days. Thereafter, remove the plastic for aeration

B. TOBACCO DISEASES AND CHEMICAL CONTROL

1. Wildfire, Angular leaf spot, Damping off, Root rot, Algae infection			
Pesticide Trade Name	**Active ingredient**	**Mixture Rate**	**Method and timing of application** (not advisable to apply chemicals after topping to avoid chemical residues)
Copper oxychloride 85 WP	Copper oxychloride	300 - 500 g / 100 litres of water – nursery	Spray 200 -500 *ml* of mixture per m² starting 4 weeks after germination. Spray at weekly interval. Not recommended for field use.
		1 g copper/1 *l* pond water -Nursery	Apply at 3 weeks after sowing. Apply in the pond and mix thoroughly. Not recommended for field use.
Sporekill	Didecyl Dimethyl Ammonium chloride	0.25 ml of chemical per *l* of pond water- nursery	Apply once 3 weeks after sowing by pouring into the pond water and mixing thoroughly. Used on floating tray system
2. Nematodes			
Velum 400 SC	Fluopyram	1 L/ha dilute into 420 liters	Apply 30 m*l* per planting station at transplanting- good results realized when Velum is integrated with a resistant variety
Velum 500 SC	Fluopyram	834 m*l*/ha Into 416 liters Water	Apply 30 m*l* per planting station at transplanting (advisable to integrate Velum with a nematode resistant variety)
3. Alternaria brown spot, Anthracnose, Frogeye			
Dithane M 45	Mancozeb 80 WP	100-150 g/100*l* water or 2 x cup 5 or 1x cup 16/10 *l* water-nursery	Spray 200-500 m*l* of mixture/m² depending on size. Start two weeks after germination at fortnight intervals. Start with 200m*l*/m² and increase to 500 m*l*/m² for full grown seedlings or at first sign of disease.

Kocide 101	Cupric hydroxide 77	150-250 g/100*l* water or 1xcup 16/10 *l* water -nursery	Spray 200 -500 m*l* of mixture/m² depending on size. Start two weeks after germination at fortnight intervals. Start with 200 m*l*/m² and increase to 500 m*l*/m² for full grown seedlings or at first sign of disease.
Bion 50 WG	Acibenzolar –S-methyl	12.5 g/10*l* water-nursery	Apply by spraying at 7 weeks after germination. Repeat after two weeks.
		60 g/ha/400*l* water-lands	Apply at 4 weeks after transplanting. Adhere to application time. Repeat application two weeks later. Do not exceed two applications. Not recommended after 6 weeks
Rovral	Iprodione 25 SC	2*l*/400*l* water/ ha-lands	Spray once at 2 weeks after transplanting
Ortiva 250 SC	Azoxystrobin 250 g/l	1*l*/400*l* water/ ha-lands	Apply by spraying using knapsack sprayer. Spray the plants at 4-5 weeks after transplanting. Repeat the application two weeks later if there are continued wet weather conditions
Cabrio Duo	Pyraclostrobin 3.8% w/w + dimethormorph 6.9% w/w	Dilute 2.5 *l* of chemical into 300 liters of water	Apply by spraying using knapsack sprayer. Spray the plants at 4-5 weeks after transplanting. Repeat the application two weeks later if there are continued wet weather conditions
4. Soreshin			
Baytan	Triadimenol 15 WP	330 g/100*l* water or 1xcup 30/10 *l*-nursery	Drench 2*l* of mixture/m² two days before pulling seedlings for transplanting

C. WEED CONTROL

Annual grasses, Some broad leaf, Yellow nut sedge			
Trade Name	**Active ingredient**	**Mixture Rate**	**Method and timing of application**
Focus Ultra	Cycloxyidimm ethyloleate	1.2 *l*/ha or 80 m*l*/15*l* sprayer to 500 m ridge – lands	Post-emergence herbicide – apply 200-400*l* of mixture/ha or 1x 15*l* sprayer to 500m ridge.
Trif	Trifulalin	1.2-1.6 *l*/ha or 80 -105 m*l*/15 *l* sprayer	Pre-emergent – apply 200-400*l*/ha. Spray and incorporate with a light disking ridging should follow. Or spray after ridging and incorporate 10-15 cm deep before holing out
Dual Magnum 960 EC	S Metolachlor	1.5 *l*/ha or 100 m*l*/15*l* knapsack sprayer-lands	Apply 200-400 *l* of mixture/ha or 1x15*l* sprayer to 500 m ridge. Apply pre-planting before holing out or as an overall spray within three days of transplanting
Frontier Optima	Dimethenamid	0.7 *l*/ha	Pre-emergent application. Dilute 0.7 litres of Frontier Optima into 200 litres of water. Apply once soon after transplanting tobacco either in the morning or late afternoon.
Pree	Metazachlor	0 20% clay, 1.0 *l*/ha; 20% + 1.2 *l*/ha-lands	Pre-emergent application. On dry land crops metazachlor must not be used soils of less than 20% clay
Command 4 EC	Clomazone	1.5 *l*-1.75 /ha or 100 m*l*-110 m*l*/ 15 *l* sprayer –lands	Apply 200-400*l* of mixture/ha or 1x 15*l* sprayer to 500 m ridge. Ideally as an overall spray after transplanting. Application can take place up to four weeks. Do not spray later than four weeks after Planting

D. SUCKERCONTROL

Trade Name	Active ingredient	Mixture Rate	Method and timing of application
Antak	N-decanol	1 part of suckercide to 25 parts of water-lands	Apply 1xcup 8 to tobacco topped between 18-20 leaves or cup 16 to tobacco topped at 20 leaves and above. Topping and suckercide application should take place in the same operation for best results. Do not apply to wet Crops
Fair 85	N-decanol/Octanol	1 part suckercide to 25 parts water-Lands	Apply 1 x cup 8 to tobacco topped between 18-20 leaves or cup 16 to tobacco topped at 20 leaves and above. Topping and suckercide application should take place in the same operation for best results. Do not apply to wet Crops
Tabamex 360 EC	Butralin	1.5 *l*/100*l* water or 150 m*l*/ 10*l* water-lands	Apply 1 x cup 8 to tobacco topped between 18-20 leaves or cup 16 to tobacco topped at 20 leaves and above. Topping and suckercide application should take place in the same operation for best results
Yamaotea Super 305 EC	Flumetralin, 125 g/*l* + Butralin, 180 g/*l*	1 part of suckercide to 120 parts of water or 80 m*l* in 10 liters water	Apply 1 x cup 16 to the topped plant. Topping and suckercide application should take place in the same operation for best results. The chemical will be effective if no rain falls for two hours after application
Fabulin Forte 305 EC	Flumetralin, 125 g/*l* + Butralin, 180 g/*l*	1 part of suckercide to 120 parts of water or 80 m*l* in 10 liters water	Apply 1 x cup 16 to the topped plant. Topping and suckercide application should take place in the same operation for best results. The chemical will be effective if no rain falls for two hours after application
Tobularin Super	Flumetralin, 125 g/*l* + Butralin, 180 g/*l*	1 part of suckercide to 120 parts of water or 80 m*l* in 10 liters water	Apply 1 x cup 16 to the topped plant. Topping and suckercide application should take place in the same operation for best results. The chemical will be effective if no rain falls for two hours after application
Flumetralin	Flumetralin	13.5 m*l*	Dilute 13.5 m*l* of Flumetralin into 1 litre of water Apply 8m*l* of the mixture immediately after topping by applying at the tip of the plant, allowing the chemical to run down the stem to reach each leaf axil
Royaltac	N-decanol	42 m*l*	Dilute 42 m*l* of Royaltac into 1 litre of water. Apply 8m*l* of the mixture immediately after topping by applying at the tip of the plant, allowing the chemical to run down the stem to reach each leaf axil

PROHIBITED AGROCHEMICALS IN TOBACCO		
TRADE NAME	**ACTIVE SUBSTANCE**	**REMARK**
2,4,5-T	2,4,5-T	The destination of our tobacco will not accept tobacco with detection of any of the listed prohibited CPAs
2,4-D	2,4-D	
Accotab	Pendimenthalin	
Actellic	Pirimiphos methyl	
Aldrine	Aldrin	
Ambush	Permithrin	
Antex	Dieldrin	
Azodrin	Monocrotophos	
Benlate	Benomyl	
Benodanil	2-idobenzanilide	
BHC	Hexachlor (BHC)	
Bulldock 0.05GR	Beta-cyfluthrin	
Chlordane	Chlorodane	
Compound B	Dicamba	
DDT	DDT	
Dipterex	Trichlorfon	
DMDT, Marlate	Methoxychlor	
Dursban 480 EC	Chloropyriphos	
Dysyston	Disulfoton	
EDB	Ethylene dibromide 92	
Fusillade	Fluazifop-P-Butyl	
Heptagran	Heptachlor	
Herbifume	Metham Sodium	
J-38, Athio	Formothion	
Lannate	Methomyl	
Metaxysttox	Demeton-S-Methyl	
Methyl Bromide	Methyl Bromide	
Nativo 300 SC	Tebuconazole+ trifloxystrobin	
Nenagon	Dibromochloropropane	
Orthene	Acephate	
Penite	Arsenicals	
Planavin	Nitralin	
Ridomil	Metalaxyl	
Ripcord 20 EC	Cypermethrin	
Rogor 40 EC	Dimethoate	
Sanocide, HCB	Hexachlorobenzene	
Tamaron	Methamidophos	
TDE	TDE	
Temik	Aanacarb	
Thunder 145 OD	Imidacloprid+Beta-cyfluthrin	
Tilam	Pebulate	
Toxaphene	Camphechlor	
Vydate	Oxamyl	
Zineb	Zinc enthylene	

WARNING

- Use of prohibited pesticides should be avoided as it will result in non-compliance with customer requirements and country of destination regulations
- Growers must comply with the specific recommended use, mixture rates, application methods and pre-harvest/withholding periods which are indicated on the pesticides labels.
- Late and heavy application of chemical to leaf must be avoided as this may result in unacceptably high residual levels.
- It is recommended to wear protective clothing (gumboots, overalls, face masks and gloves) at all times when handling pesticides
- Avoid applying chemicals on windy days, when it's raining or during hot conditions

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Farmers are urged to take advantage of the services offered by ARET so that tobacco productivity, quality and profits are increased. ARET is there for you, our dear farmers and other stakeholders, and the services are just a call away