agriculture
& rural development
Department:
agriculture
& rural development
PROVINCE OF KWAZULU-NATAL

Research & Technology
BULLETIN
2016-17/09

Chemical control options for Fall armyworm in maize

Suzette Bezuidenhout and Archana Nunkumar

The Fall armyworm (*Spodoptera frugiperda*) has been noticed for the first time in South Africa this year.

Various active ingredients have been registered for control of the insect on maize.

Insecticides

The list of active ingredients registered for control is listed in Table 1.

ONLY PRODUCTS REGISTERED FOR CONTROL OF FALL ARMYWORM ON MAIZE CAN BE USED.

TABLE 1 Registered insecticides for the control of Fall armyworm on maize

Active ingredient	Trade name	Registration nr	Company
Benfuracarb/Fenvalerate	Oncol Super 220 SC	L7649	Dow AgroSciences
Carbosulfan	Marshall	L3314	FMC Chemicals
Chlorantraniliprole	Coragen	L8592	DuPont de Nemours
	Prevathon 150 SC	L9150	
Chlorantraniliprole/Lamda-cyhalothrin	Ampligo	L8685	Syngenta
Chlorpyrifos	Agropyrifos	L4888	Arysta LifeSciencec
	Avi Klorpirifos 480 EC	L4318	Avima
	Pyrinex 480 EC	L4673	Adama South Africa
Chloropyrifos/Cypermethrin	Cyperfos 500 EC	L7606	Nulandis
Emamectin benzoate	Emma	L9022	Arysta LifeScience
	Proclaim	L7581	Syngenta
	Promec 20 EW	L9729	Meridian Agrochem Company
	Vitex 50	L9525	
	Warlock 19.2 EC	L9872	Adama South Africa
Flubendiamide	Belt	L8860	Bayer
Indoxacarb	Addition 150 EC	L9146	Villa Crop Protection
	Advance 150 EC	L9147	Universal Crop Protection
	Doxstar Flo	L9884	Meridian Agrochem Company
	Steward	L6332	DuPont de Nemours
	Steward 150 EC	L8453	
Lufenuron	Judge	L9927	Arysta LifeScience

TABLE 1 continued …..			
Active ingredient	**Trade name**	**Registration nr**	**Company**
Mercaptothion	Avi Guard (Lawns only)	L0216	Avima
	Datathion 500 EC	L0828	Nulandis
Methomyl	Cyplamyl 90 SP	L3436	Castle Ag-Chem
	Masta 900 SP	L949	Arysta LifeScience
	Methomyl 200 SL	L7100	Universal Crop Protection
	Methomate 200 SL	L8123	Villa Crop Protection
	Methomex 200 SL	L5253	Adama South Africa
	Methomax 900 SP	L5254	Nulandis
	Mylomex 900 SP	L4783	
	Spitfire	L8197	Bitrad Consulting
Novaluron/Indoxacarb	Plemax	L10246	Adma South Africa
Profenofos	Farmag Profenofos 500	L5547	Castle Ag-Chem
Pyridalyl dichloropropene derivative	Sumipleo	L8377	Philagro South Africa
Spinetoram	Delegate 250 WG	L8329	Dow AgroSciences
Spinetoram/Methoxyfenozide	Uphold 360 SC	L10164	
Bacillus thuringiensis var *aizawai*	Florbac WG	L5531	Valent Biosciences
Bacillus thuringiensis var *kurstakii*	Delfin	L9761	Madumbi Sustainable Agric
Beaveria bassiana	Eco Bb	L8469	Madumbi Sustainable Agric
FAW Pheromones		Import permit	River Bioscience

Please read and follow the label for instructions, any warnings and waiting periods, if any.

DO NOT MAKE USE OF UNREGISTERED MIXTURES OF DIFFERENT INSECTICIDES OR INCREASE THE DOSAGE RATES.

Adjust the water pH and add adjuvants if necessary in accordance with label recommendations.

Application

According to CropLife South Africa, they advise spraying when 5-10% of the plants have been infected. Effective control can only be obtained if the larvae are sprayed during the early development stages. Control of adult larvae is very difficult. Spray the larvae when they are visible, e.g. when they are feeding on exposed leaf surfaces or the outside of the cobs. As soon as they penetrate the whorl or are inside the cobs, nothing will effectively control them. Therefore, early detection is essential as the small larvae are easier to control, effectively.

The application equipment must be in a good working condition and be calibrated before any application is done. Do not spray between the maize rows as the target sites will be missed and control will be inadequate. Aim the application at the insects in the plant row. Adhere to guidelines for the safe application of the insecticide, such as wearing protective clothing and using face masks. More information on the storage and safe use of agrochemicals can be found in Research Bulletin 2015/11 which is available at http://www.kzndard.gov.za/resource-centre/fact-sheets-brochures-and-leaflets

Control can be variable when using carbamates and organophosphates. Therefore, use it first on a small area before applying it to a bigger area. Also note that if heavy infestations do occur, the frass (excrement) of the insect can create a “plug” which prevents penetration of the insecticide into the whorl where the larvae may feed.

Insecticide resistance

The insect is known for building-up resistance to insecticides very quickly. It is therefore essential that farmers rotate insecticides with different modes of action to avoid resistance build-up (Table 2). Rotating between different active ingredients is not enough. Consecutive generations of Fall armyworm must be treated with insecticides with different modes of action. Insecticides belonging to the diamide chemical class must be used with care.

Please consult the labels of these insecticides with regards to application cycles and the number of applications per season.

DO NOT APPLY PYRETHROIDS ON THEIR OWN AS THE INSECT IS RESISTANT TO IT AND WOULD THEREFORE NOT BE CONTROLLED.

TABLE 2 Different modes of action on the insecticides registered for the control of Fall armyworm on maize

Active ingredient	Chemical class	IRAC classification (Mode of Action)
Benfuracarb/Fenvalerate	Carbamate/Pyrethroid	1A/3A Acetylcholinesterase (AChE) inhibitors/ Sodium channel modulators
Carbosulfan	Carbamate	1A Acetylcholinesterase (AChE) inhibitors
Chlorantraniliprole	Diamides	28 Ryanodine receptor modulators
Chlorantraniliprole/ Lamda-cyhalothrin	Diamides/Pyrethroid	28/3A Ryanodine receptor modulators/Sodium channel modulators
Chlorpyrifos	Organophosphate	1B Acetylcholinesterase (AChE) inhibitors
Chloropyrifos/Cypermethrin	Organophosphate/ Pyrethroid	1B/3A Acetylcholinesterase (AChE) inhibitors/Sodium channel modulators
Emamectin benzoate	Avermectin	6 Glutamate-gated chloride channel (GluCl) allosteric modulators
Flubendiamide	Diamides	28 Ryanodine receptor modulators
Indoxacarb	Oxadiazine	22A Voltage-dependent sodium channel blockers
Lufenuron	Benzoylureas	15 Inhibitors of chitin biosynthesis, type 0
Mercaptothion	Organophosphates	1B Acetylcholinesterase (AChE) inhibitors

TABLE 2 continued …..		
Active ingredient	**Active ingredient**	**Active ingredient**
Methomyl	Carbamate	1A Acetylcholinesterase (AChE) inhibitors
Novaluron/Indoxacarb	Benzoylureas/Oxadiazine	15/22A Inhibitors of chitin biosynthesis, type 0/ Voltage-dependent sodium channel blockers
Profenofos	Organophosphates	1B Acetylcholinesterase (AChE) inhibitors
Pyridalyl dichloropropene derivative	Pyridalyl	UN Compounds of unknown or uncertain MoA
Spinetoram	Spinosyns	5 Nicotinic acetylcholine receptor (nAChR) allosteric modulators
Spinetoram/Methoxyfenozide	Spinosyns /Diacylhydrazines	5/18 Nicotinic acetylcholine receptor (nAChR) allosteric modulators/ Ecdysone receptor agonists
Bacillus thuringiensis spp		11A Microbial disruptors of insect midgut membranes

The list is updated on a regular basis to include new registrations. Below is a link to CropLife South Africa to obtain the upgrades. Click on “Manage the Fall armyworm outbreak in South Africa”.
http://www.croplife.co.za

Acknowledgement

We thank CropLife South Africa for the information regarding the registered insecticides.

Contact

Dr Suzette R. Bezuidenhout[1]
Professional Scientist
Tel: 033 355 9408
Suzette.bezuidenhout@kzndard.gov.za

Ms Archana Nunkumar[1]
Professional Scientist
Tel: 033 343 8094
Archana.nunkumar@kzndard.gov.za

Ms Hlengiwe Gumede[2]
Professional Scientist
Tel: 034 212 2479
Hlengiwe.gumede@kzndard.gov.za

KZN Department of Agriculture & Rural Development
Agricultural Crop Research Services
Crop Scientific Research Services
Crop Protection, Cedara[1] & Dundee[2]

Published February 2017