

APSTW02 - CORESTA CONGRESS OCTOBER 2018

NEW TRENDS IN TOBACCO CROP PROTECTION

A Zimbabwean case study

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Presentation Outline

- Pesticide (aka CPAs) registration & use in Zimbabwe
- The trends in CPA registrations 1991 to 2018
- Tobacco pest control options for the Zimbabwean grower
- The role of pesticides in future
- The future of tobacco pest control in Zimbabwe



In Zimbabwe....

Emphasis placed on the production of tobacco using



- **Best Management Practises**
- **Good Agricultural Practises (GAP)**
- **Thus, agrochemical use is regulated.**

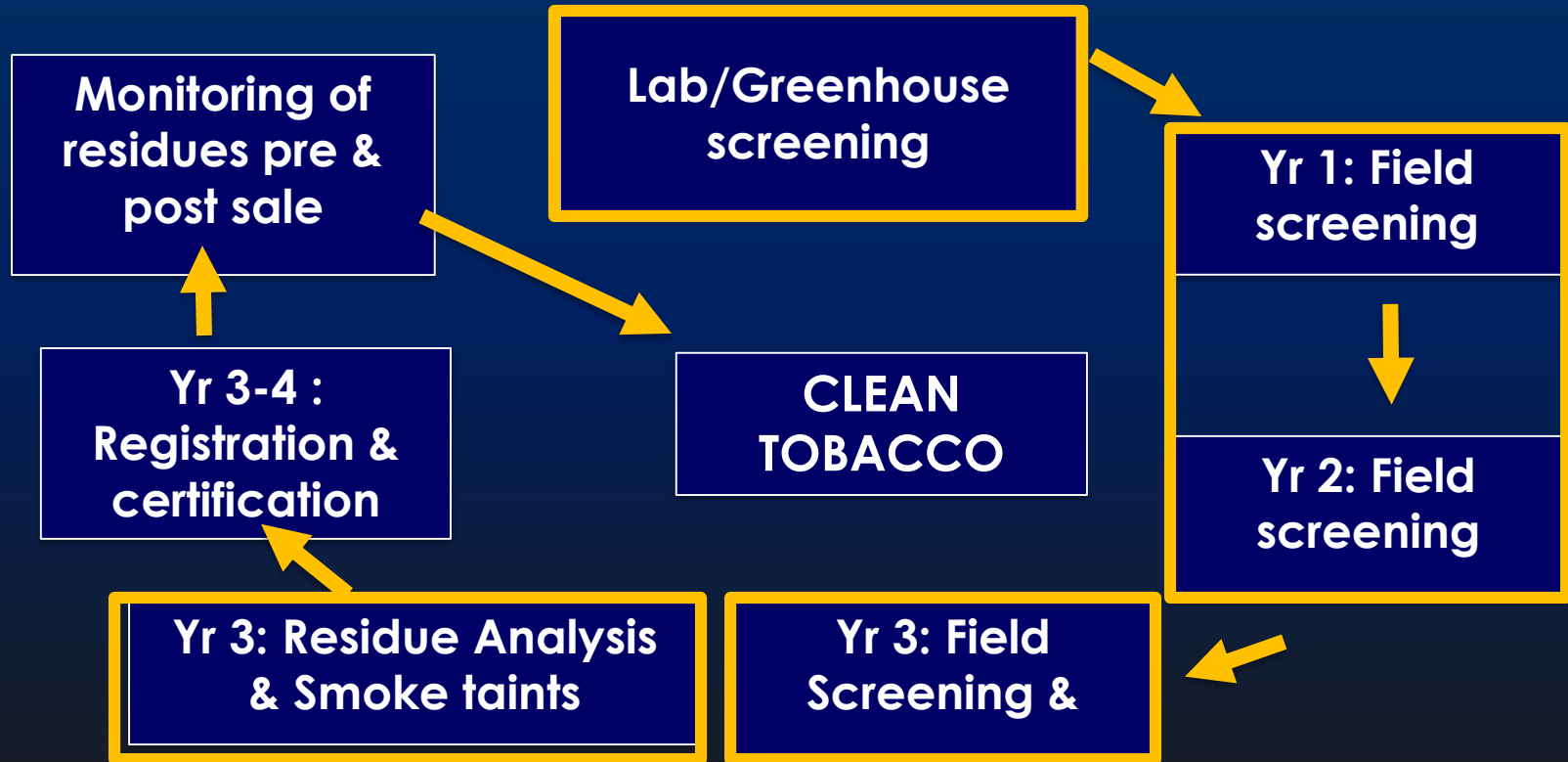
BEFORE THEY CAN BE USED ON TOBACCO.....

- All pesticides must be approved for and registered for use on tobacco.
- TRB mandated by an Act of Parliament to **evaluate & approve** all pesticides for use on tobacco

The process takes 3-4 yrs



Agrochemical evaluation process in Zimbabwe – **New Active Ingredient**



The Evaluation Process – **Already Registered Active Ingredient**

Active Ingredient already registered but the CPA is....

- From a **new source**
- A **new formulation**

1 Year Field Screening

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graph TD; A[1 Year Field Screening] --> B[Yr 1: Residue Analysis & Smoke taints]; B --> C[Yr 1-2: Registration & certification];
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Yr 1: Residue Analysis
& Smoke taints

Yr 1-2 : Registration &
certification

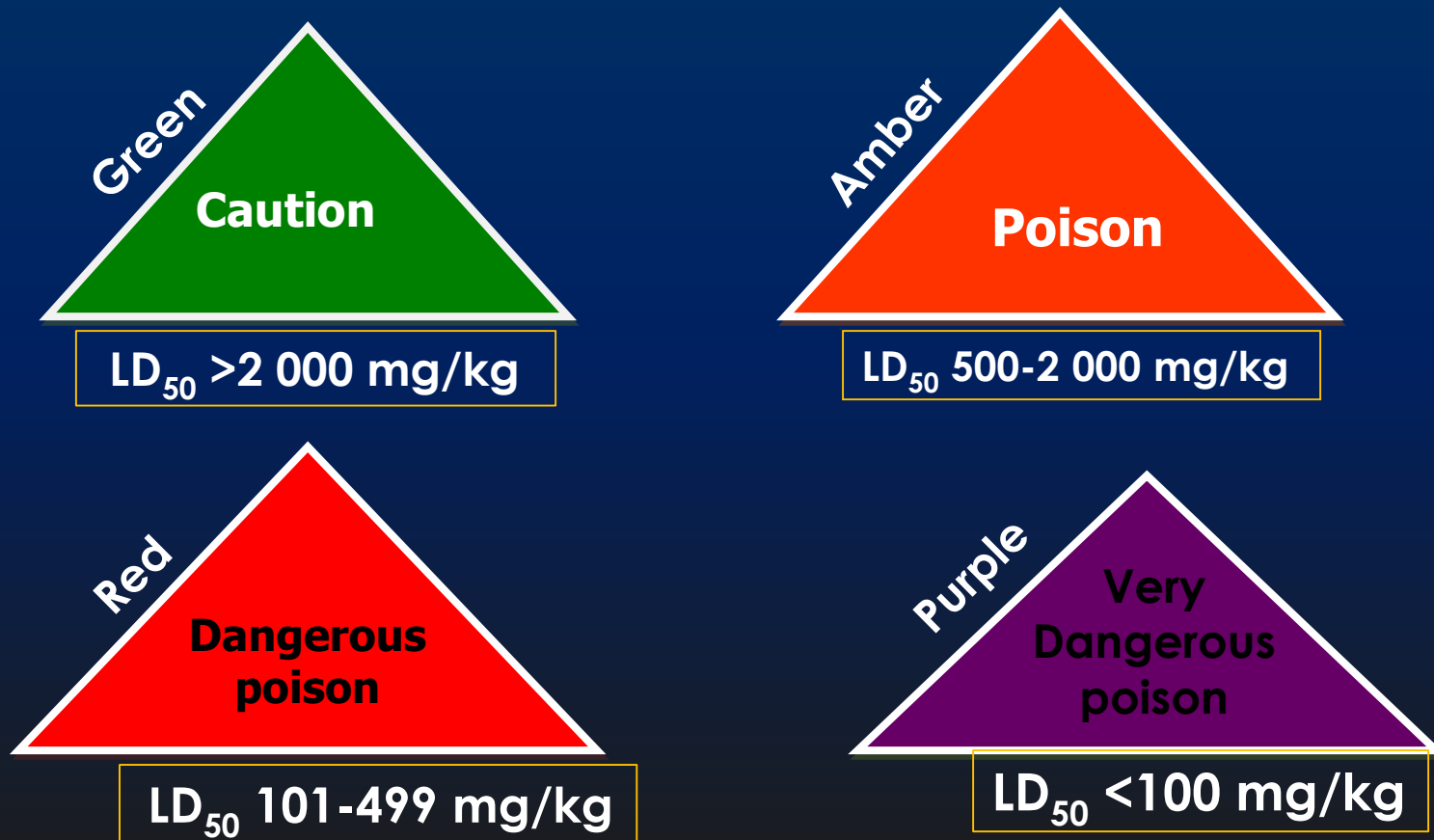
PESTICIDE APPROVAL IN ZIMBABWE

Done since 1964, still ongoing. Growers provided with information on;

- *Minimum effective dosage rate*
- *Appropriate time of application*
- *Best and safest method of application*
- *The appropriate protective clothing (for the **CPA's Toxic Category**)*

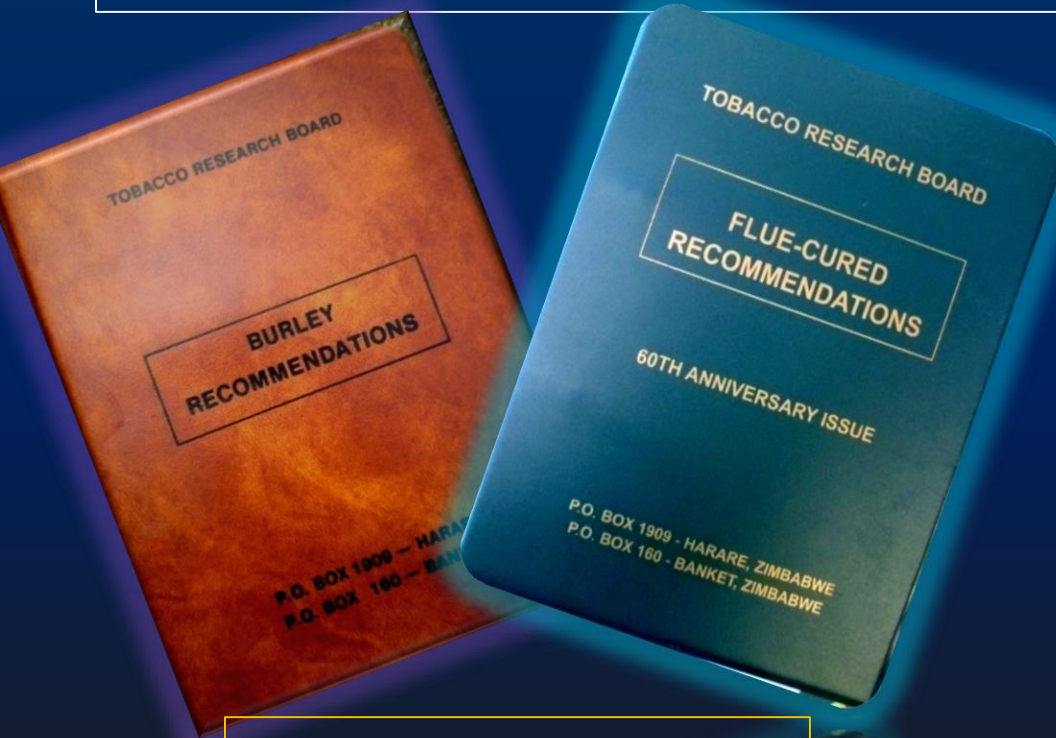


Toxicity categories for CPAs in Zimbabwe





INFORMATION AVAILED TO GROWERS....



Handbooks of recommendations

Website

'Dear Grower' letters

Page 2 **UPDATED LIST OF PESTICIDES APPROVED FOR USE ON TOBACCO IN ZIMBABWE** October 2009

Chemical Name	Trade Name	Old TRB number	Current TRB number	Expiry date
AGRICURA (PVT) LTD				
Acephate	Acephate 75SP	05-09-D-82	09-12-D-93	29.07.2012
Alachlor	Alachlor Herbicide 48 EC	05-07-C-92	07-10-C-149	30.06.2010
Chlorpyrifos	Chlorpyrifos 48 EC	05-09-D-56	09-12-D-77	29.07.2012
Copper oxychloride	Copper Oxychloride 60 FW	05-07-B-85	07-10-B-148	31.01.2010
Copper oxychloride	Copper Oxychloride 85 WP	08-11-B-29	09-11-B-57	29.11.2011
Dimethoate	Dimethoate 40	05-09-D-57	09-12-D-87	29.07.2012
Ethylene dibromide	Minifume EDB	05-09-E-124	09-12-E-89	29.07.2012
Fenvalerate	Fenvalerate 20 EC	05-09-D-58	09-12-D-88	29.07.2012
Haloxypop-R-methyl ester	Gallant Super	N/A	09-7-C-162	26.09.2010
N-decanol	Deka	05-09-G-117	09-12-G-92	29.07.2012
Oxamyl	Nemat 310L	05-09-E-90	09-12-E-91	29.07.2012
Pendimethalin	Agritop EC	05-08-G-93	08-11-G-18	09.05.2011
Trifluralin	Trif	05-09-C-72	09-12-C-90	29.07.2012
Propaquizafop	Agil 100 EC	06-09-C-141	09-12-C-111	29.07.2012
Chlorothalonil	Bravo 500 SC	05-09-B-89	09-12-B-112	29.07.2012
Tnadimenol	Shavit 25 EC	06-09-B-143	09-12-B-113	29.07.2012
ALMOND AGROCHEMICALS (PVT) LTD				
Acetamiprid	Acetamark 20SP	N/A	09-10-D-94	17.06.2010
BAYER ZIMBABWE (PVT) LTD				

On Residues....

- In case of residues of **unapproved pesticides being detected** or where residues are **above tolerances**

- ✓ grower **not allowed** to reap or sell the crop &
- ✓ no compensation paid.

A powerful deterrent against use of unapproved agrochemicals

WHAT HAVE BEEN THE TRENDS IN CPA USE IN ZIMBABWE?

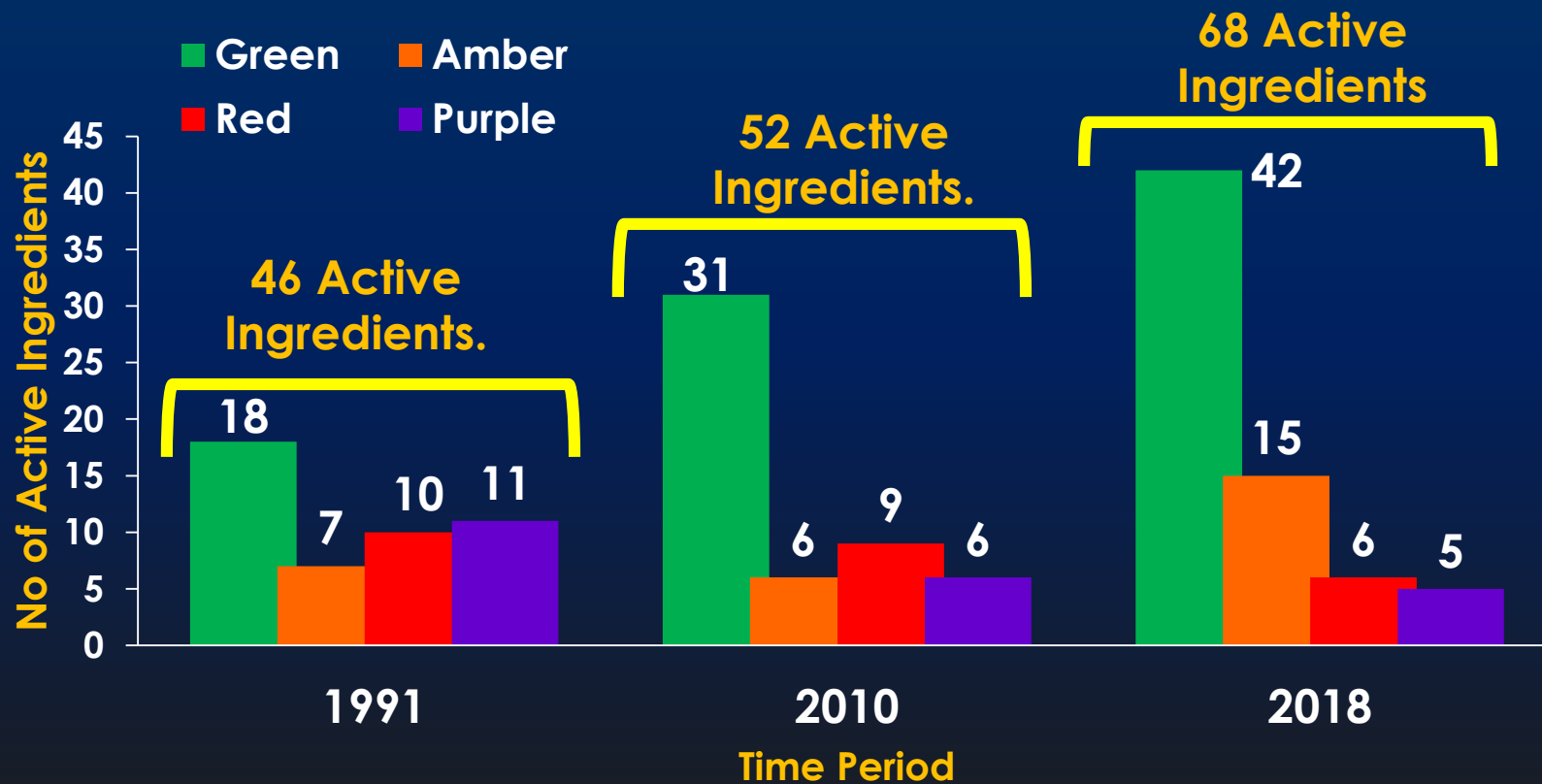
METHOD USED

A snapshot of the tobacco handbook of recommendations – List of approved CPAs in

- Year 1991
- Year 2010
- Year 2018



CPAs REGISTERED FOR USE ON TOBACCO

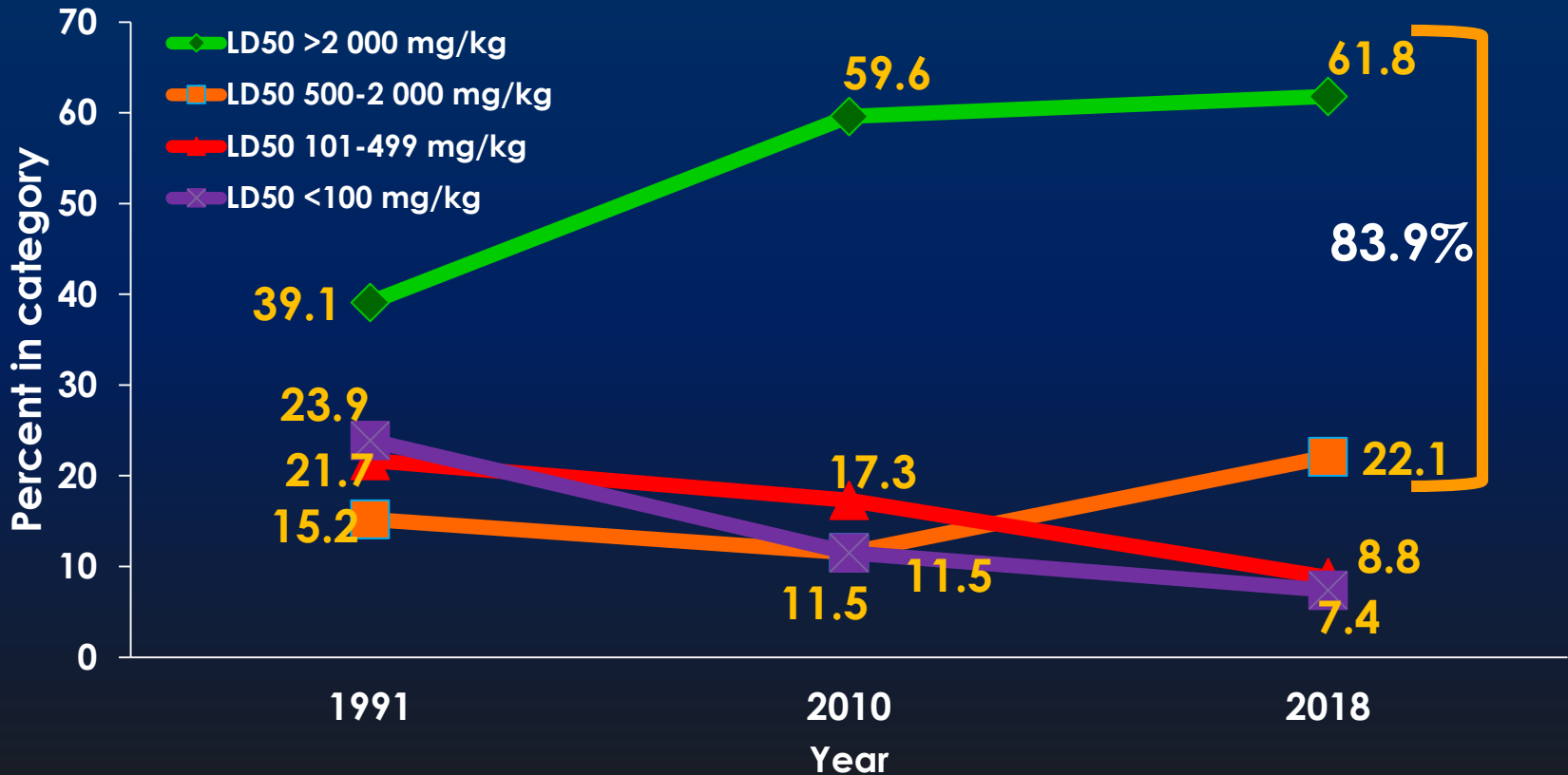


CPAs FOR USE ON TOBACCO - TRENDS



- Growers continually availed with a wide range of CPAs (e.g 68 ai in 2018 vs 46 in 1991)
- A clear increase in the safer green label CAPs

REDUCTION IN RED & PURPLE CPAs



REDUCTION IN RED & PURPLE CPAs

Aldicarb	P	Carbamate
Methamidophos	P	Organophosphate
Methyl bromide	P	Organobromide
Monocrotophos	P	Organophosphate
Ethylene Dibromide (EDB)	P	-
Disulfoton granules	P	Organothiophosphate
Fenvalerate	R	Pyrethroid
Acephate	R	Organophosphate
Thiodicarb	R	Carbamate

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Part of the list

REMAINING PURPLE LABEL CPAS IN 2018

PRODUCT		CLASS
1.3 Dichlopropene	Organochlorine	Nematicide
Fenamiphos	Organophosphate	Nematicide
Metham Sodium	Carbamate	Nematicide
Oxamyl	Carbamate	Nematicide
Methomyl	Carbamate	Insecticide

RECENTLY REGISTERED NEMATOCIDES

NEMATOCIDE	YEAR REGISTERED	TOXICITY LABEL
Fluensulfon (A)	2017	LD ₅₀ > 500 mg/kg
Abamectin (R) <i>Streptomyces avermitilis</i>	2017	LD ₅₀ > 500 mg/kg
Fluopyrum (G)	2015	LD ₅₀ > 2000 mg/kg

Do an excellent job especially in combination with resistant cultivars and good rotations

NEW NEMATOCIDES UNDER EVALUATION

Nematicide	Biopesticide based on...	Comments
Nematic®	Plant Extract - <i>Semacarpus ancardium</i>	2nd season- 1st results - promising
Rhizoshield®	Biocontrol - Mycorrhiza spp & Paecilomyces	Protocol needs refinement
Nematox®	Biocontrol - Paecilomyces	3 rd season - Promising
Zytonic®	Mycorrhiza based	3 rd season - Promising
Porcius®	Mushroom extract - <i>Pleurotus ostreatus</i>	1st season evaluation
Antares®	Mushroom extract - <i>Pleurotus pulmonarius</i>	1st season evaluation

MORE CPAs ON THEIR WAY OUT....

CPA	NEW REPLACEMENTS
Neonicotinoids: Imidacloprid, Thiamethoxam, Acetamiprid, Thiacloprid	Anthranilic diamides: Chlorantraniliprole, Cyantraniliprole, Emmamectine Benzoate, Prosular oxymatrine, Cyromazine, Flupyradifurone,
Methomyl (P) 31 Dec 2018 deadline	Flubendiamide, Indoxacarb, Emamectin benzoate, Prosular oxymatrine
Chlopyrifos, (R) 31 Dec 2018 deadline	Anthranilic diamides Cyantraniliprole, Chlorantraniliprole+Lambda; Catarp-HCL
Deltamethrin (G)	Biopesticide based on <i>Beauveria spp</i> & Azadiractin
Fipronil (A)	Still searching.....

NEW PRODUCT REPLACEMENTS

PESTICIDE CLASS	ACTIVE INGREDIENT
INSECTICIDES	Chlorantraniliprole, Emmamectine Benzoate, Prosular oxymatrine, Cyromazine, Lufenuron, Indoxacarb, Cyantraniliprole, Flupyradifurone, Pymetrozine, Emamectin+lufenuron
FUNGICIDES	Fluoxystrobin, Pyraclostrobin+Dimethomorph
HERBICIDES	Propaquizafop, Dimethenamid-p, Bentazone
SUCKERCIDES	Pelagonic Acid (to replace Pendimethalin)

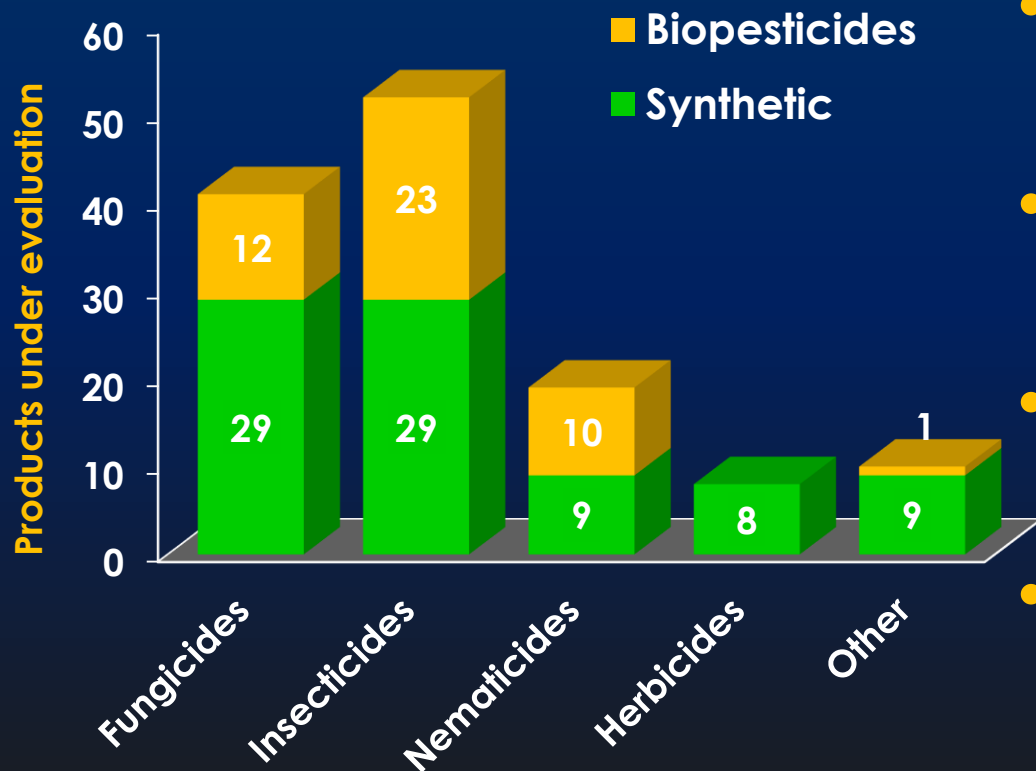
NEW PRODUCT REPLACEMENTS

....a new emerging trend....

An increase in biopesticides....

Biopesticides – Derived from natural materials eg. Fungi, Bacteria, Plant Extracts, certain minerals etc

THE ADVENT OF BIOPESTICIDES



- In 2018 134 CPAs under evaluation
- 46 CPAs – Biopesticides
- At various stages of testing : 1st -3rd season
- From 15 Agrochem companies

WITH BIOPESTICIDE USE

Paradigm shift required

Not broad spectrum, no immediate knock down effect

- **Appreciate long-term impacts – not short-term gains**
- **Used in an IPM setup – good results**



WHAT'S OUT & WHAT'S IN

OUT

- Organophosphates
- Carbamates
- Fumigants
- Pyrethroids
- Neonicotinoids

In....

- Diamides/Ryanoids **
- Anthranilic Diamides**
- Biopesticides

**Safer : due to specific target site activity

HOW FAR WE HAVE COME...

HOW FAR WE HAVE COME.....

In Sep 2001 Dr Blair advising growers said;

- Fumigate seedbeds - ~~Methyl-bromide~~
- Fumigate lands – ~~EDB~~
- Planting water - Add ~~Chlorpyrifos~~
- Late Plantings - ~~Disulfoton~~ or ~~Aldicarb~~



Today An IPM Approach Necessary...

- Use the greener replacement CPAs
- Adopt new technologies – e.g float tray system
- Select multi-disease resistant cultivars
- Comply with set legislation
- Use cultural control tech.



Kutsaga Gnatbuster®

THE FLOAT TRAY SYSTEM

- Soiless media
- No fumigants required
- Smaller area
- Fewer chemicals



THE FLOATING TRAY SYSTEM - ADOPTION

- Adoption rate increasing
- Increase shown by float trays sales pattern



MULTIDISEASE RESISTANT CULTIVARS

K RK 66 (R)

KM10 (S)



Performance of a r/knot nematode susceptible vs resistant var under high nematode pressure

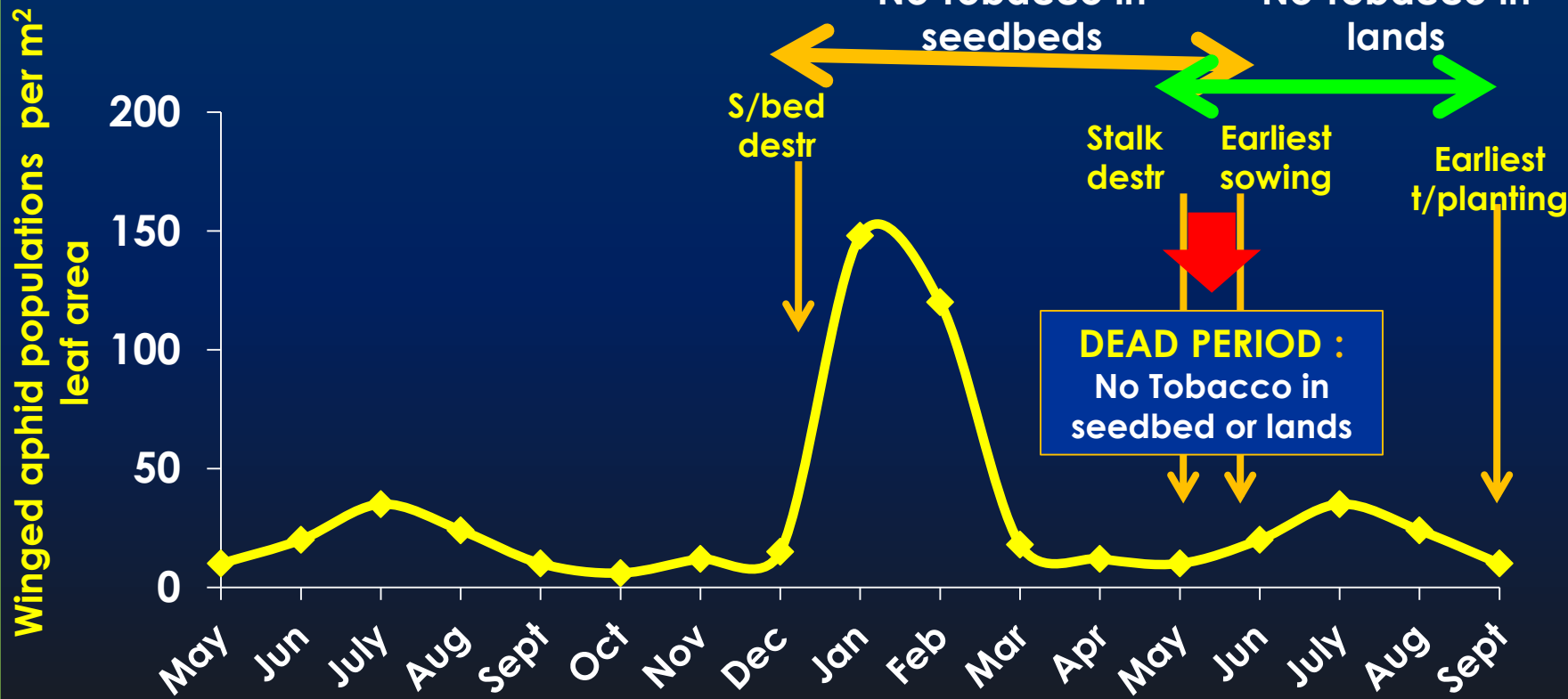
LEGISLATIVE CONTROL

Gives dates that all tobacco growers must comply with

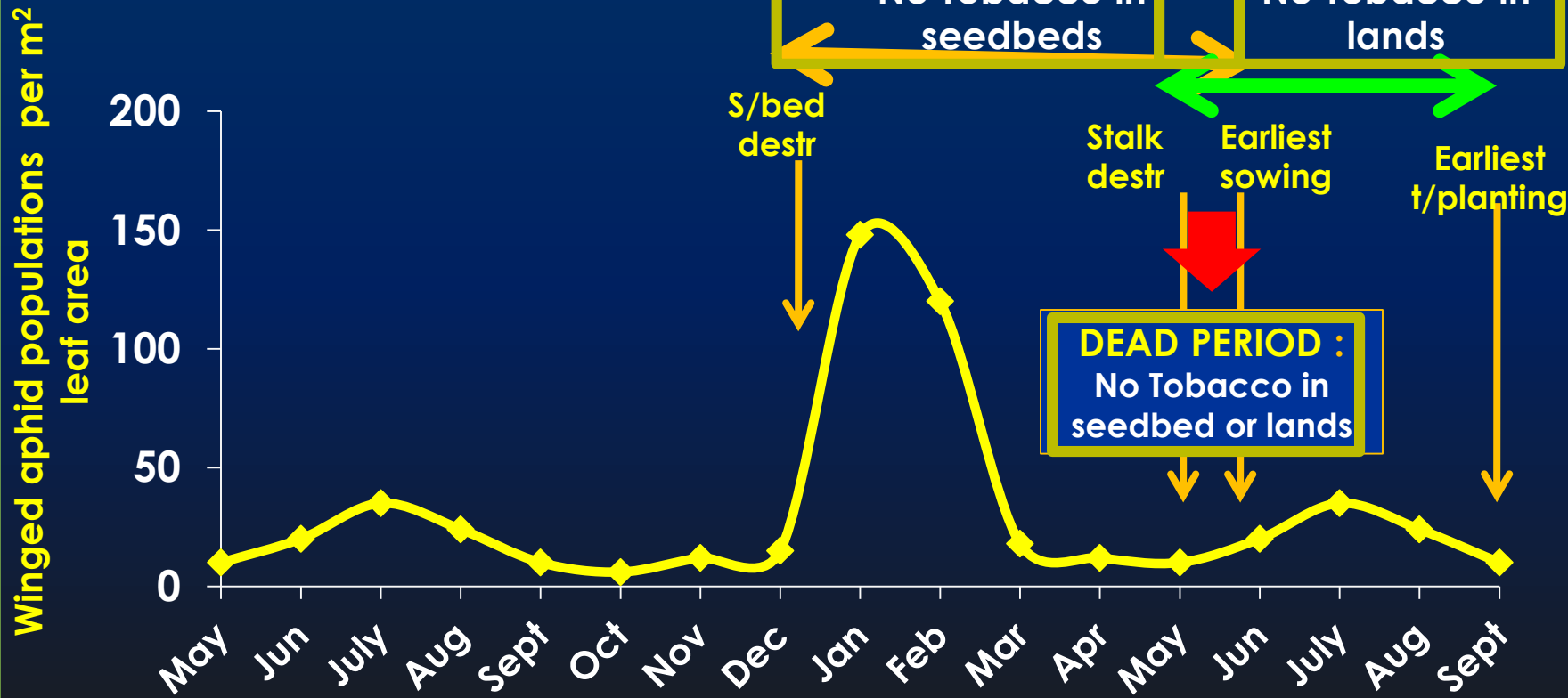
- **15 May** – All stalks completely destroyed
- **01 June** – Earliest seedbed sowing
- **01 September** – Earliest transplanting
- **31 December** – Seedbeds destroyed

Effective for managing aphids and the virus diseases they transmit – based on Winged Aphid population trends

WINGED APHID NOS & THE LEGISLATED TOBACCO FREE PERIODS



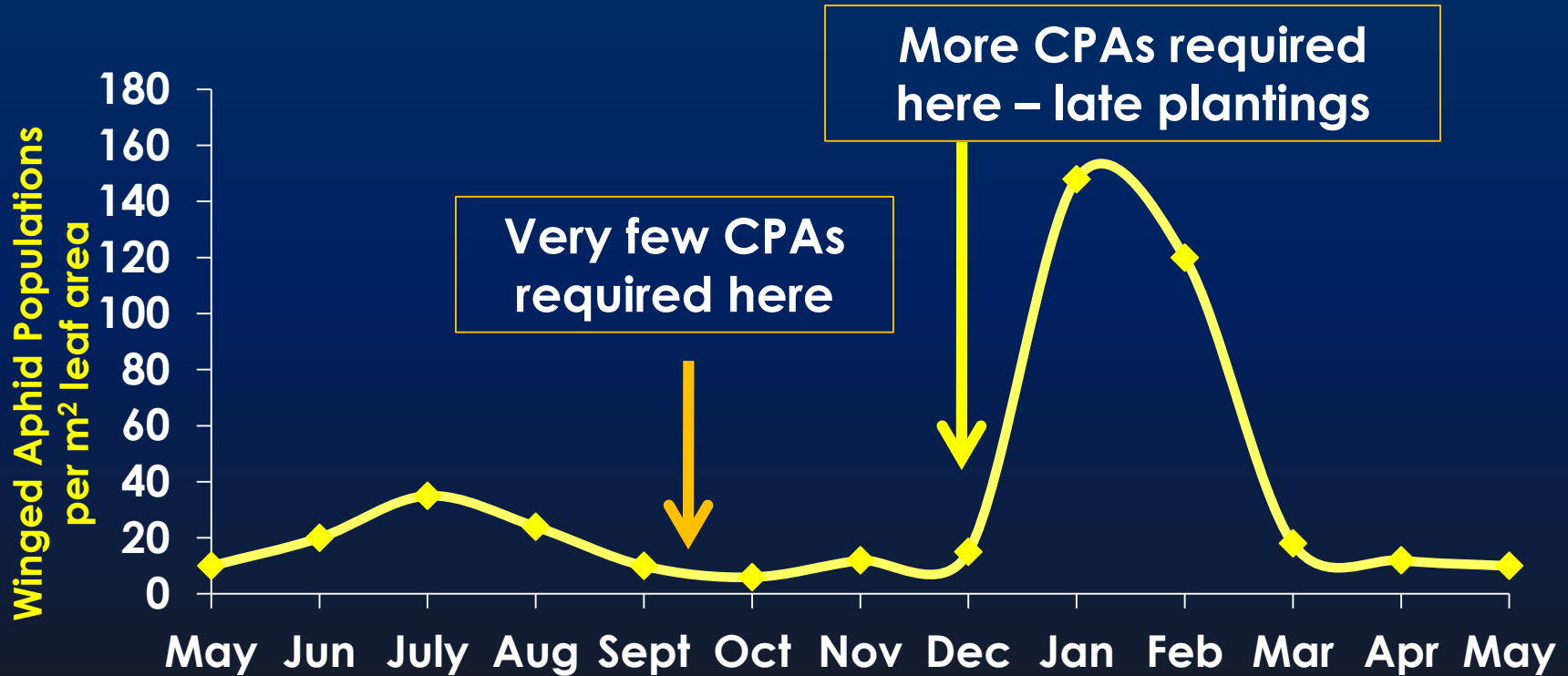
WINGED APHID NOS & THE LEGISLATED TOBACCO FREE PERIODS



APHID NUMBERS & TIMING OF PLANTING



APHID NUMBERS & TIMING OF PLANTING



THIS IS HOW FAR WE HAVE COME.....

In 2018 we advise growers.....

- Use the float tray system
- Use resistant cultivars plus any of Fluopyrum/Fluensulfon/etc
- Planting water - Add any of Flupyradifurone/Cyantraniliprole/etc
- Late Plantings - Emmamectine Benzoate, Prosular oxymatrine/etc



IN SUMMARY.....

The trends for Zimbabwe

- Reduction in the harmful Pur/Red label CPAs
- Increase in the new **environmentally & user friendly** Green label CPAs
- An influx of biopesticides

These may not give the immediate knockdown effect or wide spectrum of activity – but more sustainable & effective in an IPM setup

PESTICIDES USE ON TOBACCO IN THE FUTURE

- Pesticides - will continue to play a role in tobacco PM ...foreseeable future
- Dominance of more environmental friendly - reduced-risk CPAs
- In use via precision application technologies - that reduce adverse off-target effects



THE FUTURE OF TOBACCO PEST CONTROL

- **Judicious choice of CPAs**
- **No reliance on one control method - IPM**
- **Diverse basket of pest-management strategies**



Is one that ensures that tobacco production is more responsible & sustainable 😊

Thank you