



A glimpse into the future..

By TOM MURRAY



Where to:



With Pesticides?



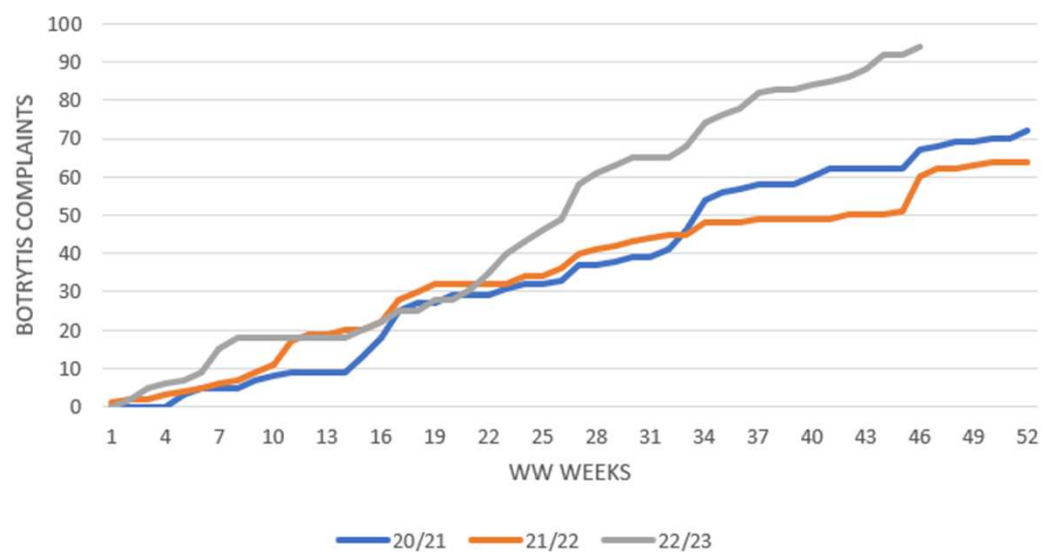
With legislation?



Pesticides



Botrytis Complaints



Rots caused by several strains of the fungus *Botrytis cinerea*
Teleomorph: *Botryotinia fuckeliana*



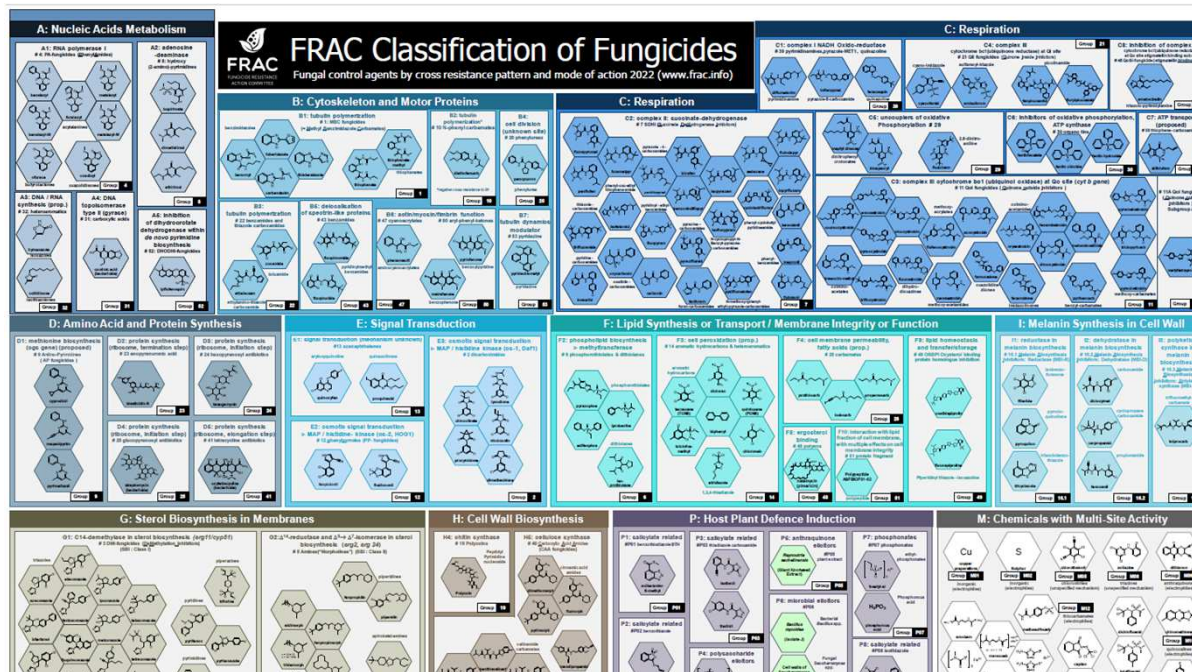
Fungicide Testing

Pyrimethanil Boscalid + Pyraclostrobin Fenhexamid Ortiva (Azoxystrobin) Astound (Fludioxonil + Cyprodinil)	Folpet	Global Degree of Resistance
Sensitive to 1 ppm	Sensitive to 2 ppm	SENSITIVE (S)
Resistant to 1 ppm	Resistant to 2 ppm	MILD RESISTANCE (MR)
Resistant to 3 ppm	Resistant to 4 ppm	RESISTANCE (R)
Resistant to 5 ppm	Resistant to 10 ppm	HIGH RESISTANCE (HR)

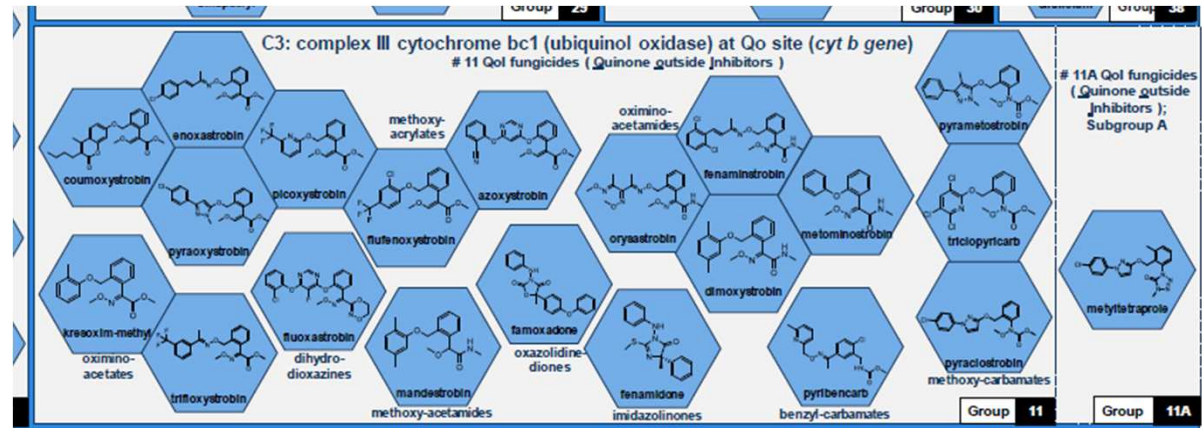
Pathogen isolated	Fungicide	Degree of Resistance	Group
<i>Botrytis sp.</i>	Folpet	Mild resistance	M04
	Pyrimethanil	High resistance	9
	Boscalid + Pyraclostrobin	High resistance	7 & 11
	Fenhexamid	High resistance	17
	Ortiva (Azoxystrobin)	High resistance	11
	Astound (Fludioxonil + Cyprodinil)	Sensitive	12 & 9
<i>Botrytis sp.</i>	Folpet	Sensitive	M04
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EC50 (half maximal effective concentration): the lower the EC50, the less the concentration of a drug is required to produce 50% of maximum effect and the higher the potency.

Fungicides



Resistance



- Repeated and incorrect use of targeted fungicides (site-specific fungicides), as with medicines are prone to resistance (the same with leaky vaccines and antibiotics).
- Resistance to one in a group is resistance to all.
- Resistance is permanent.
- Resistance may also be present across groups with similar modes of action.
- <https://www.frontiersin.org/articles/10.3389/fmicb.2016.02075/full>



Legislation

Pending Legislation



On-farm impact of the GHS criteria

Use of the GHS Criteria in South Africa

The Globally Harmonized System for Classification and Labelling of Chemicals (known as the GHS criteria for short) is incorporated into South African legislation and will have an on-farm impact going forward. The latest developments include a notice from the Registrar under Act 36 of 1947 to implement the GHS criteria for chemical hazard classification. This implies that all agricultural remedies and fertilizer labels and safety datasheets must be GHS compliant. Furthermore, active substances classified within certain hazard groups (1A or 1B carcinogenic, mutagenic or reproductive toxin) are due to be phased-out in South Africa by June, 2024. These two aspects are addressed in this edition of the Cutting Edge.

The Department of Employment and Labour also recognizes and includes the GHS standards under the Occupational Health and Safety Act No. 85 of 1993, applying to self-employed or employees who carry out work at a workplace which may expose any person to a hazardous chemical agent and manufacturers,

products, mixtures, preparations, formulations and solutions. The GHS sits alongside the UN Transport of Dangerous Goods system and is sometimes referred to as the Purple Book reflecting the purple binding of the hard copy of the criteria. The ninth revised edition of the GHS published in 2021 is the most recent revised edition.^{1,2}

The purpose of the GHS is to enhance the protection of human health and the environment by providing an internationally comprehensible system for hazard communication, to provide a recognized framework for countries that do not have a classification system, to reduce the need to test chemicals on animals (the GHS does not promote further testing to address adverse health outcomes, and classification is based on existing, available data) and to facilitate international trade in chemicals and products which hazards have been properly assessed and identified on a global basis. This is important, because no country has the ability to identify and specifically regulate every hazardous chemical product and many different countries have to come to the same conclusion about using information dissemination as a regulatory means to address chemical

<http://sitem.herts.ac.uk/aeru/ppdb/en/Reports/150.htm>



The **Globally Harmonized System** of Classification and Labelling of Chemicals

(GHS)

What is the GHS?



IT IS AN INTERNATIONALLY AGREED-UPON SYSTEM TO STANDARDIZE CHEMICAL HAZARD CLASSIFICATION AND COMMUNICATION.



AIM IS TO ENSURE THAT THE HAZARDOUS PROPERTIES OF CHEMICALS CAN BE UNDERSTOOD WORLD-WIDE.



FOCUS IS ON PRODUCT LABELLING AND SAFETY DATA SHEETS (SDS).



[HTTPS://UNECE.ORG/ABOUT-GHS](https://unece.org/about-ghs)

What are the objectives of the GHS?



1. Enhance the protection of human health and the environment by providing an internationally comprehensible system for hazard communication.



3. Reduce the need for testing and evaluation of chemicals.



2. Provide a recognized framework for those countries without an existing system.



4. Facilitate international trade in chemicals.

Number of Departments Involved

Department of Employment and Labour NO. 2056 29 April 2022



From 29 September 2022, manufacturers and/or suppliers of chemicals may continue to supply existing stock-in-trade that are non-GHS (Globally Harmonised System for the classification and labelling) compliant, provided that the chemical was manufactured or imported (landed and not in transit) prior to the 29 September 2022. The exemption will be for a period of 12 months, ending 30 September 2023, when all labelling and SDS (Safety Data Sheet) shall be GHS compliant.

Number of Departments Involved

Department of Agriculture, Land Reform and Rural Development
29 March 2022



agriculture, land reform
& rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

**GUIDELINE ON THE IMPLEMENTATION OF GLOBALLY
HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF
CHEMICALS CLASSIFICATION**

Number of Departments Involved

Department of Agriculture, Land Reform and Rural Development
NO. 3812 25 August 2023

STAATSKOERANT, 25 AUGUSTUS 2023

No. 49189 39

14

PART III

LABELLING AND CONTAINER

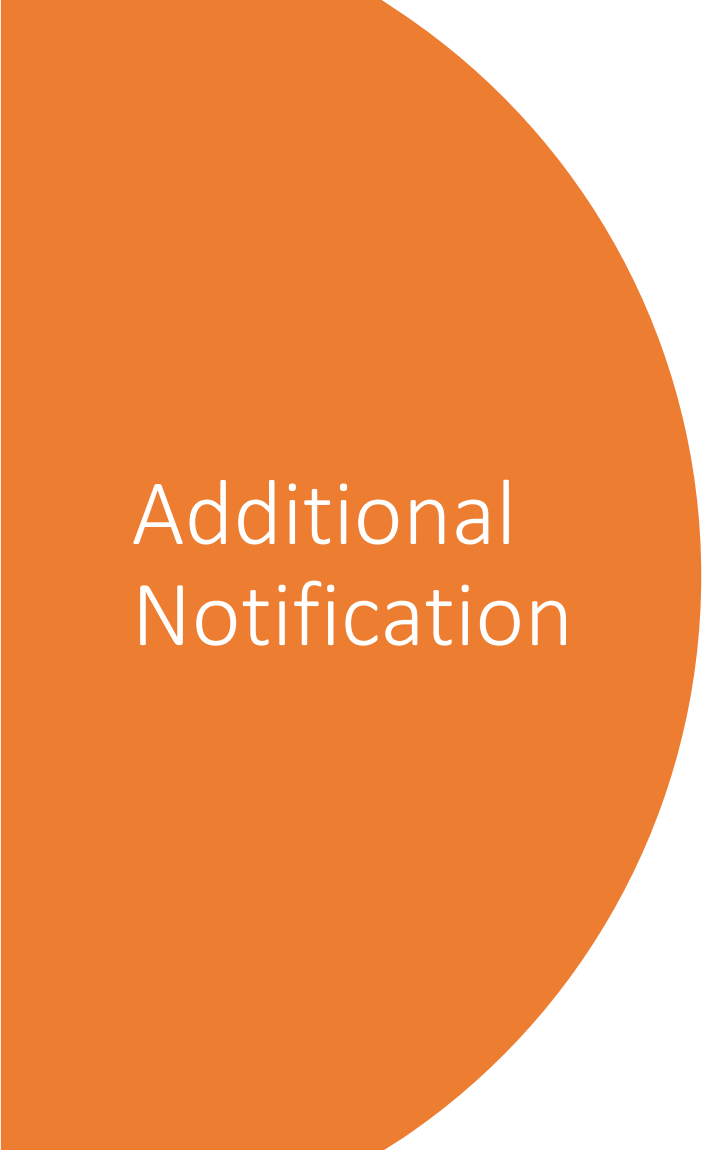
General

15. (1) The classification and labelling agricultural remedy shall be in accordance with GHS and the Hazardous Chemical Agents, 2021, published in Government Notice No. R. 280 of 29 March 2021.

(2) The registration holder shall be responsible to ensure the accuracy of the GHS classification of the agricultural remedy. Should there be any reason to question the GHS classification of the agricultural remedy, the Registrar may require an independent review of the classification by a qualified expert at the cost of the registration holder. In the event that such a review finds that the classification is incorrect, the Registrar shall require the correction of the label and, if deemed appropriate, the withdrawal of product with the incorrect label.

(3) No agricultural remedy shall be distributed or sold without a label including the package leaflets approved by the Registrar.

Languages

A large orange shape on the left side of the slide, consisting of a rectangle with a quarter-circle cutout on its right side.

Additional Notification

- 4 April 2022, notification sent to industry by the Registrar of Act No. 36 of 1947.
 - Proposed phase out of active ingredients and their formulations that meet the criteria of CMR 1A and 1B of the GHS by June 2024.
 - CMR category 1A are active ingredients and/or co-formulants that meet the criteria of a known human carcinogen, mutagen or reproductive toxin, largely based on human evidence.
 - CMR category 1B refers to a presumed human carcinogen, mutagen or reproductive toxin, largely based on animal studies.
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- Three short, curved yellow lines in the bottom right corner of the slide.

PAN International List of Highly Hazardous Pesticides – March 2021

PAN International List of Highly Hazardous Pesticides March 2021																												
					Group 1: Acute Toxicity				Group 2: Long term effects								Group 3: Environmental toxicity						Group 4: Conventions					
	CAS number	Pesticide	Grouped (see page 23)	Sum of max=1 in Groups 1-4	WHO Ia	WHO Ib	H330	max = 1	EPA carc	IARC carc	GHS* carc (1A, 1B)	IARC prob carc	EPA prob likel carc	GHS* muta (1A, 1B)	GHS* repro (1A, 1B)	EU EDC	GH* C2 & R2	max = 1	very bio acc	very pers water, soil or sediment	very toxic to aq. organism	highly toxic bees	max = 1	Montr Prot	PLC	See note below the table	POP	max = 1
0					30	52	63	118	1	4	14	8	77	5	42	1	58	159	22	18	30	118	150	1	31	0	10	36
17	90640-80-5	Anthracene oil		1				0			1							1					0					0
18	84-65-1	Anthraquinone		1				0					1		1			1					0					0
19	7778-39-4	Arsen and its compounds	x	1				0	1	1	1							1					0					0
20	68049-83-2	Azafenidin		1				0								1		1					0					0
27	17804-35-2	Benomyl		2				0						1	1			1					0		1	X		1
33	28434-01-7	Bioresmethrin		2				0								1		1				1	1					0
34	92-52-4	Biphenyl; Diphenyl		1				0			1							1					0					0
36	1303-96-4	Borax; Borate salts	x	1				0								1		1					0					0
37	10043-35-3	Boric acid		1				0								1		1					0					0
38	56073-10-0	Brodifacoum		2	1		1	1								1		1					0					0
39	28772-56-7	Bromadiolone		2	1		1	1								1		1					0					0
42	1689-84-5	Bromoxynil		2			1	1								1		1					0					0

DALRRD List:
(Is not as
long as the
PAN List..)



Active ingredient	Type	Segment
Arsenic acid	Fungicide	woodpresevative
Benomyl	Fungicide	Crop pesticide
Boric Acid /Borax	Fungicide	woodpresevative
Brodifacoum	Rodenticide	Rodenticide
Calcium arsenate	Plant Growth Regulators	Crop pesticide
Carbendazim	Fungicide	Crop pesticide
Chromium trioxide	Fungicide	woodpresevative
Coumatetralyl	Rodenticide	Rodenticide
Cyproconazole	Fungicide	Crop pesticide
Difenacoum	Rodenticide	Rodenticide
Dimethomorph	Fungicide	Crop pesticide
Epoxiconazole	Fungicide	Crop pesticide
Ethylene dibromide	Insecticide	Crop pesticide
Fluorochloridone	Herbicide	Crop pesticide
Flusilazole	Fungicide	Crop pesticide
Glufosinate ammonium	Herbicide	Crop pesticide
Halosulfuron-methyl	Herbicide	Crop pesticide
Ipconazole	Fungicide	Crop pesticide
Linuron	Herbicide	Crop pesticide
Mancozeb	Fungicide	Crop pesticide
Mineral oil (hydrotreated light paraffinic)	Insecticide, Adjuvant	Crop pesticide
Propiconazole	Fungicide	Crop pesticide
Quizalofop-P-tefuryl	Herbicide	Crop pesticide
Spirodiclofen	Insecticide	Crop pesticide
Thiacloprid	Insecticide	Crop pesticide
Thiodicarb	Insecticide	Crop pesticide
Topramezone	Herbicide	Crop pesticide
Triadimenol	Fungicide	Crop pesticide



Potential Impact: Citrus

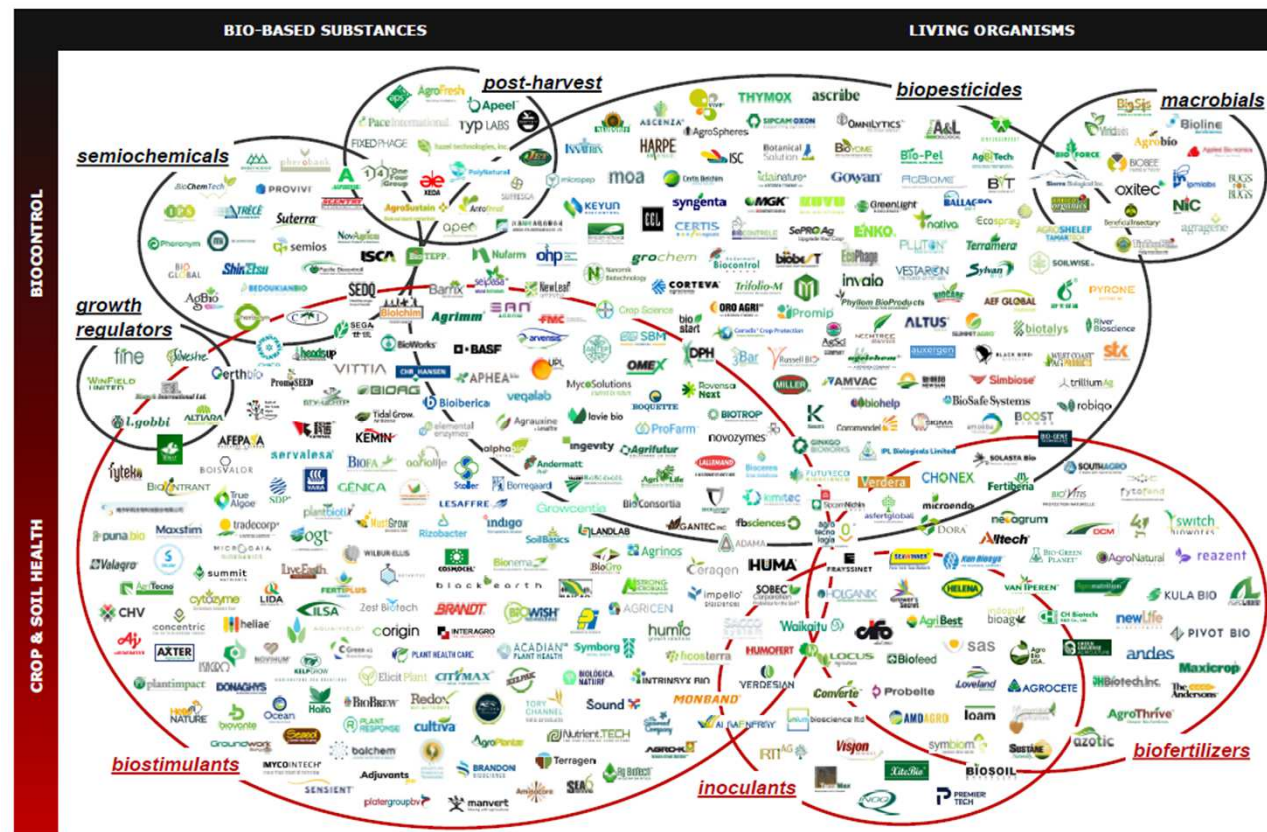
Type	Active ingredient(s)	Crops	Target pest, disease, weeds
Fungicides	Benomyl Mancozeb Propiconazole	Citrus	Black spot Black spot, melanose Post-harvest sour rot
PGR	Calcium arsenate		sugar-acid ratio
Insecticides	Mineral oil Spirodiclofen Thiacloprid		Scale Mites Thrips
Herbicides	Glufosinate-ammonium		Weeds



Potential Impact: Stone Fruit

Type	Active ingredient(s)	Crops	Target pest, disease, weeds
Fungicides	Mancozeb	Pome fruit	Septoria leaf spot
		Stone fruit	Gum spot, leaf and brown rust
	Propiconazole	Stone fruit	Powdery mildew
Insecticides	Mineral oil	Pome fruit Stone fruit	Delayed foliation, Scale
	Thiacloprid	Pome fruit	Codling moth
Herbicides	Glufosinate-ammonium	Pome and Stone fruit	Weeds

There are
options:
Biological
Landscape



A close-up photograph of two pink roses. The rose in the foreground is in sharp focus, showing the delicate layers of its petals. The second rose is slightly behind and to the right, appearing softer. The background is a dark, out-of-focus green, suggesting foliage. The text 'THANK YOU • DANKIE' is overlaid in white, bold, sans-serif font in the upper left corner of the image.

THANK YOU • DANKIE

- References:
- <https://www.hortgro.co.za/news/intended-phase-out-of-active-ingredients-and-products-classified-as-cmr-categories-1a-and-1b/>
 - <https://croplife.co.za/Article/NewsArticle?pv=cropLife-SA-and-AME-Sustainability-in-Agriculture-and-Food-Security-Workshop>

