

IziPest

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Faune
Invasive



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Rodent as a pest

Biology, impact and management



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March 2016

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1. Rodent: sanitary problematic

2

2. Rodent: main commensal species

3

3. Actual management way

4

4. Efficacy and resistance problematic

5

5. Case of house mouse management

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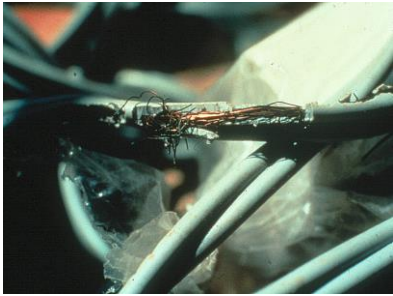
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Sanitary impact of rodents

- Consciousness of potential economical impact in case of rodent invasion (mainly brown rat)



- Consciousness of potential sanitary impact in case of rodent invasion (mainly brown rat)



Sanitary impact of rodents

Rodent live in direct contact of human beings



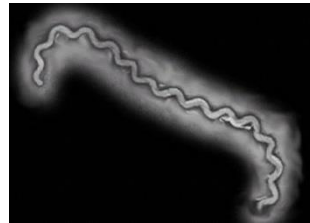
Case of sarcoptic mange in a black rat in a French farm (zoonotic disease)



Rodent: main concern of public health

Lot of new species (du to global warming ?)

Rodent (and mosquitoes) remain the main concern of public health



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Different commensal rodent species

House mouse



Black rat



Brown rat



Brown rat (*Rattus norvegicus*)



Black rat (*Rattus rattus*)

Different commensal rodent species

✓ commensal rodent: house mouse



- ✓ weight from 10 to 25g
- ✓ tail longer than body
- ✓ feces as rice grain

Different commensal rodent species

✓ commensal rodent: **brown rat**



- ✓ 250 to 500g
- ✓ Body longer than tail
- ✓ dug burrows
- ✓ live in and around buildings
- ✓ sewer rat

Different commensal rodent species

✓ commensal rodent: black rat



- ✓ smaller feces than brown rat
- ✓ large ear
- ✓ long tail
- ✓ weight less than brown rat
- ✓ specific way of life
- ✓ dug no burrows

Different commensal rodent species

Presence index

- Foot traces
- Tail traces
- Dead bodies présence



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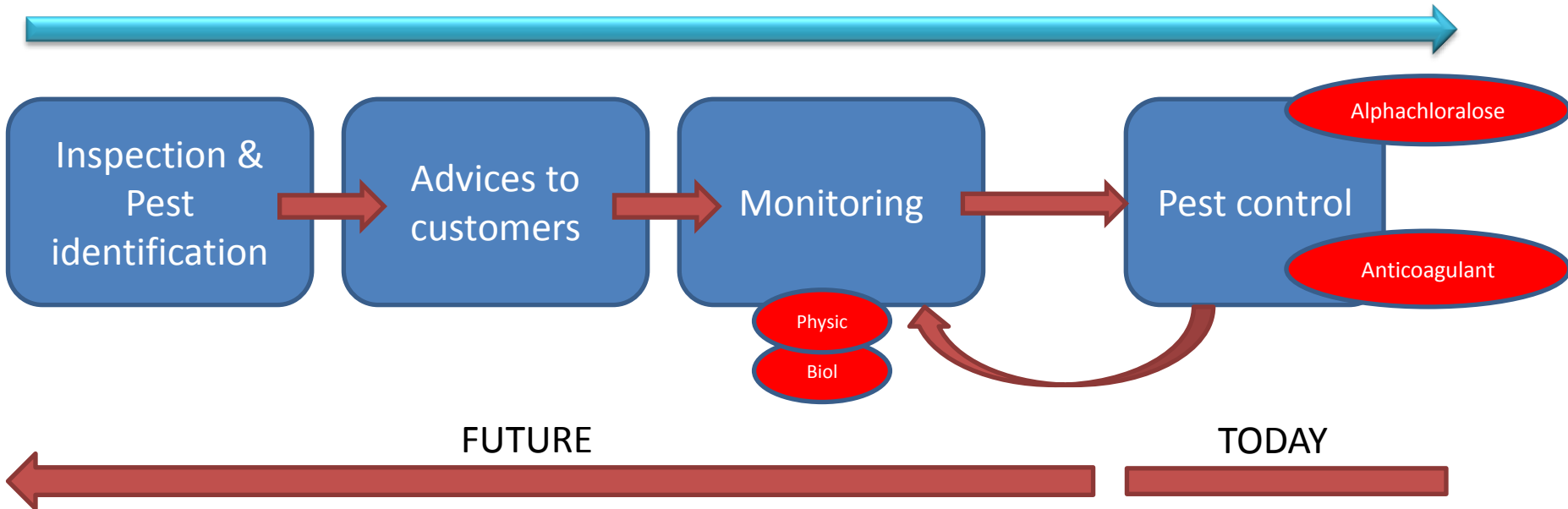
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Diagnostic process is the added value of the PCO

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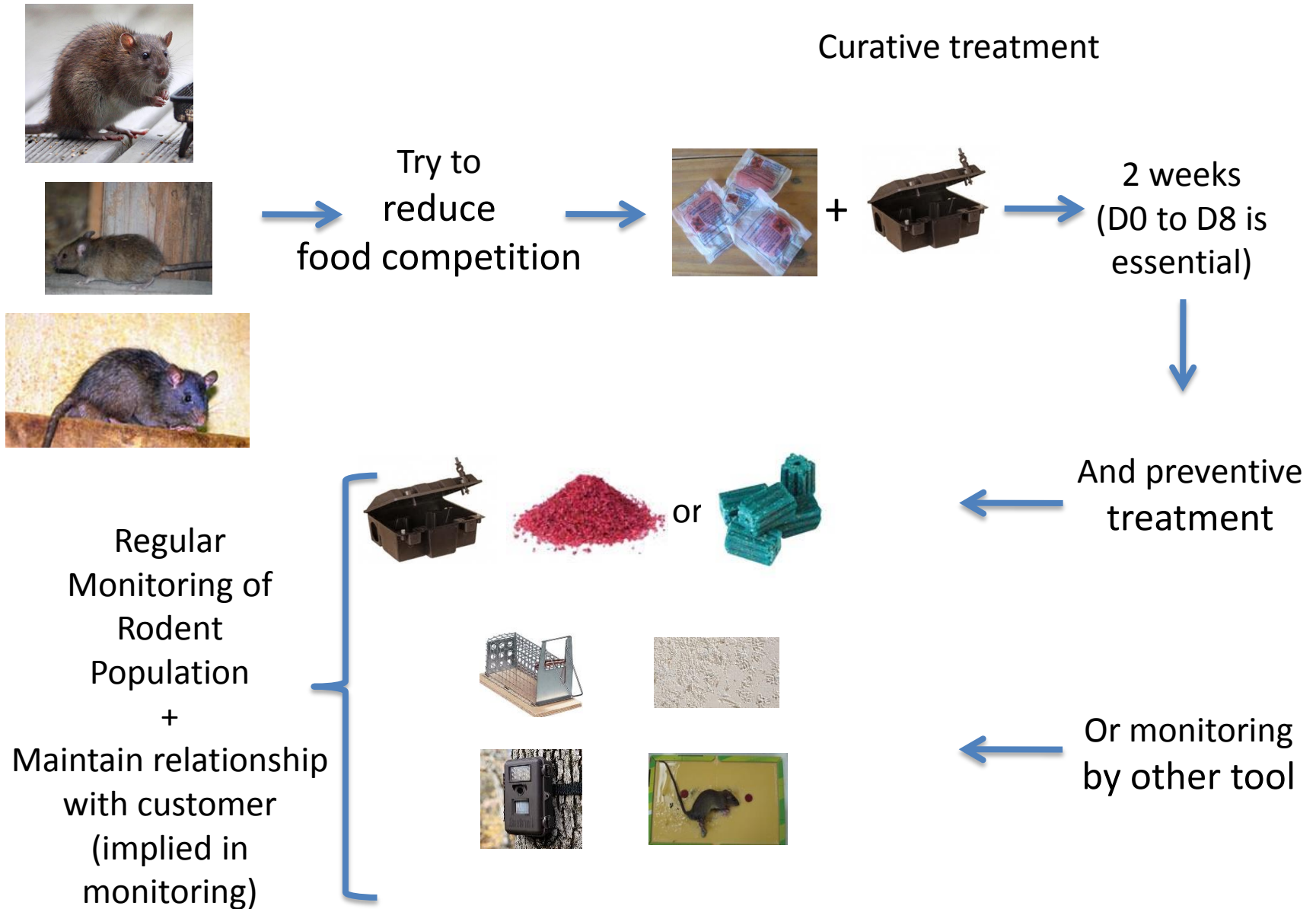


- Main challenge: *from pest control to pest management...*
- Bait application is the last action
- Adding value before and after pest control

Active ingredient used in rodent control

	Année	Inventeur
WARFARIN	1944	WARF
ALPHACHLORALOSE	1960	UNKNOWN
CHLOROPHACINONE	1961	LIPHATECH
COUMATETRALYL	1962	BAYER
DIFENACOUM	1975	SOREX
BROMADIOLONE	1976	LIPHATECH
BRODIFACOUM	1976	SYNGENTA
FLOCOUMAFEN	1984	BASF
DIFETHIALONE	1989	LIPHATECH

Use of bait in rodent control, not in all rodent management



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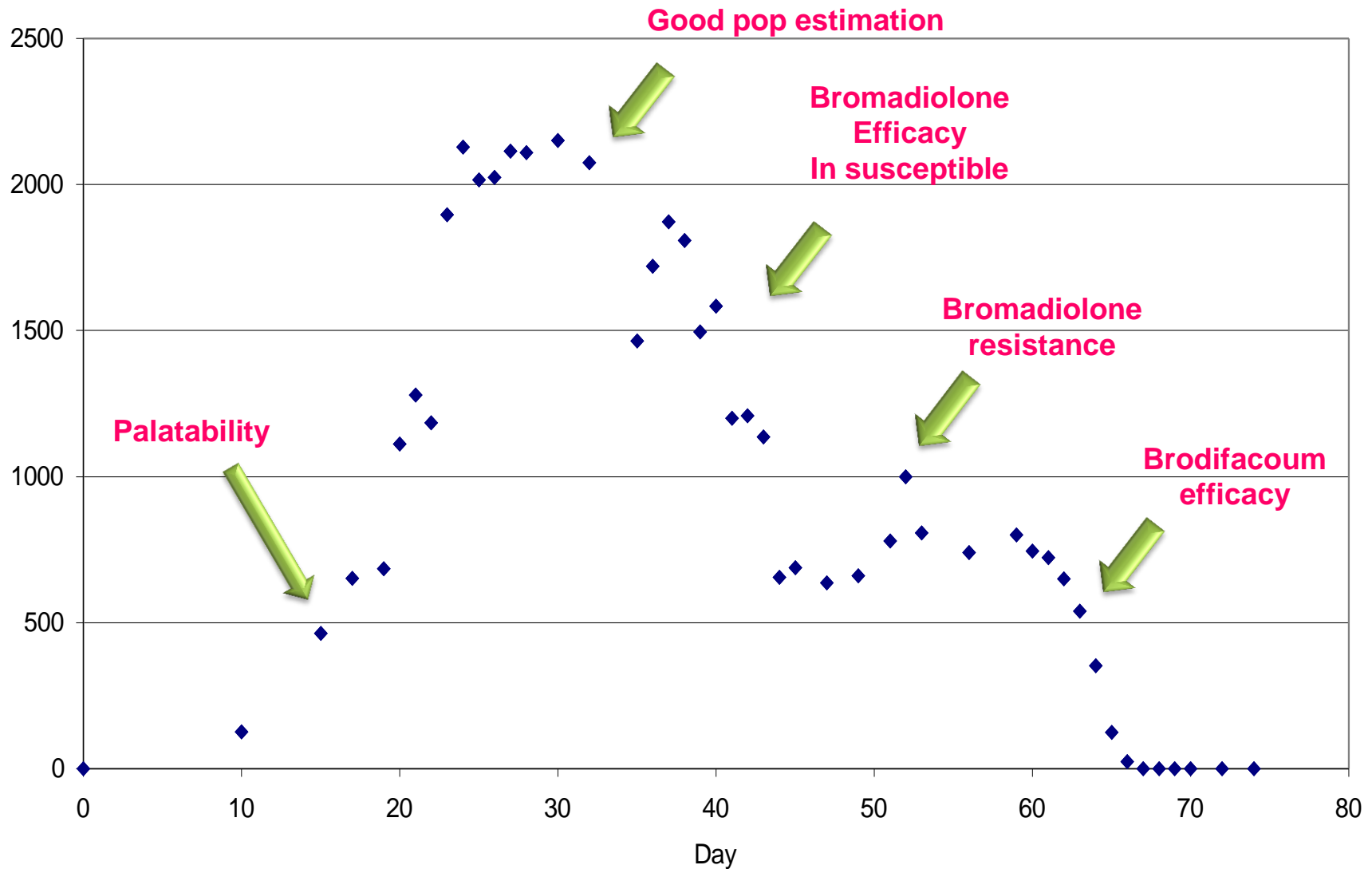
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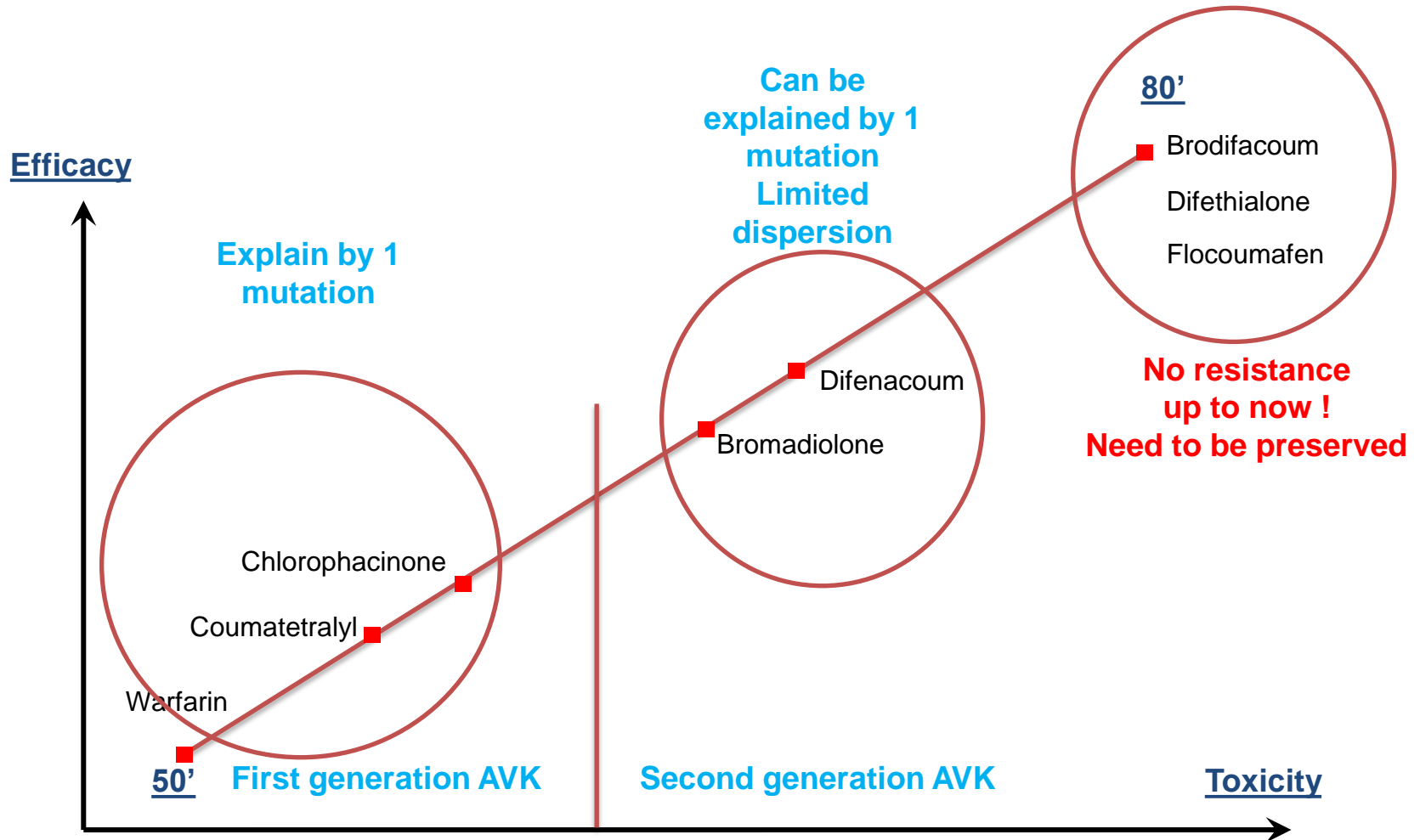
Palatability, efficacy and resistance to anticoagulant

Case of a resistant brown rat population (Y139F)



Palatability, efficacy and resistance to anticoagulant

Resistance to anticoagulant is a genetic phenomenon

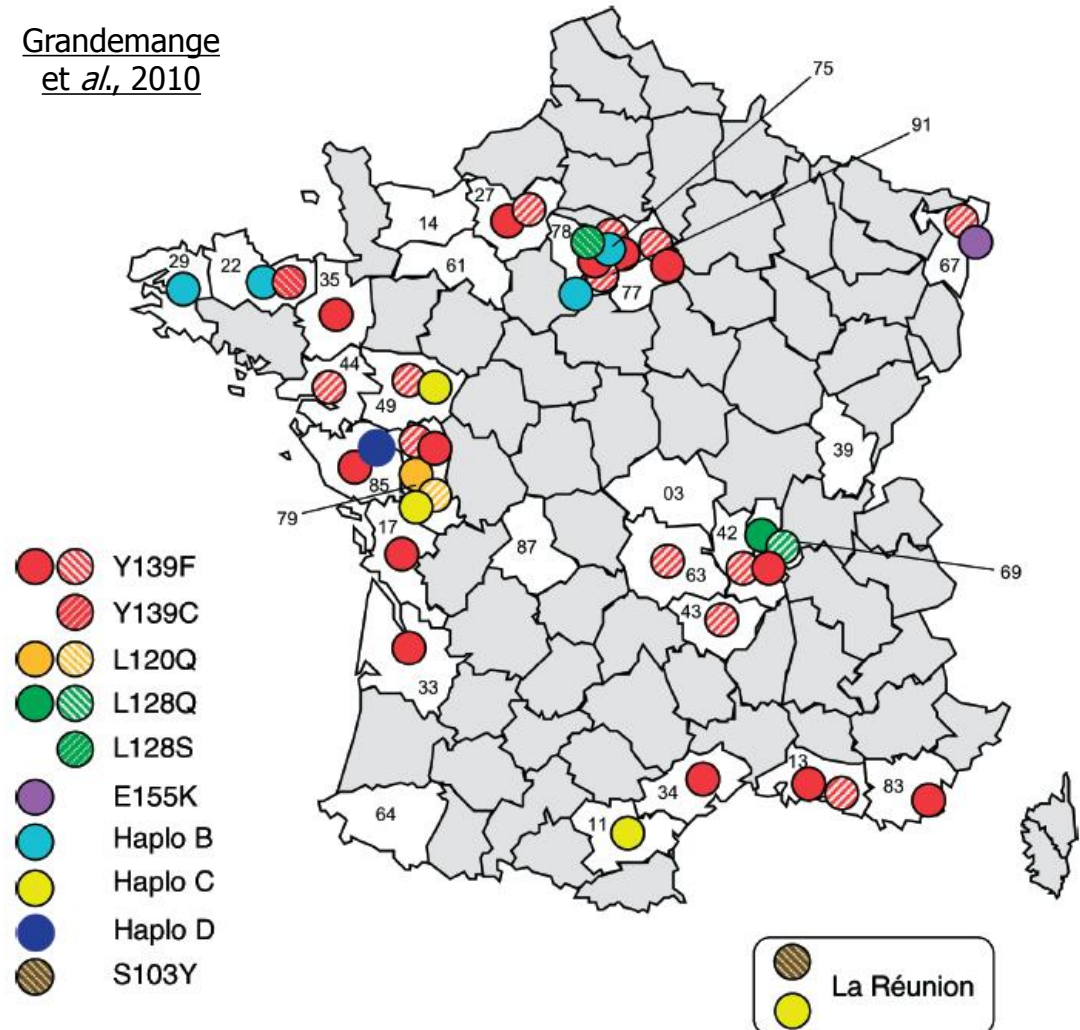


Palatability, efficacy and resistance to anticoagulant

Resistance diversity in France

- ✓ concern all commensal rodent
- ✓ 1 mutation confer resistance to 1 to 3 active ingredient
- ✓ resistance eradicate by last seconde generation AVK
- ✓ No adaptation up to now
- ✓ Need to use another action mode to preserve last seconde generation AVK

Grandemange
et al., 2010



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Management of house mouse population



- ✓ Curious
- ✓ No neophobic behaviour
- ✓ social behaviour
- ✓ well equipped in liver enzyme
- ✓ restraint daily movement perimeter (5m)
- ✓ small food daily intake

Eat less

Need to eat in life perimeter (5m)

High susceptibility to palatability

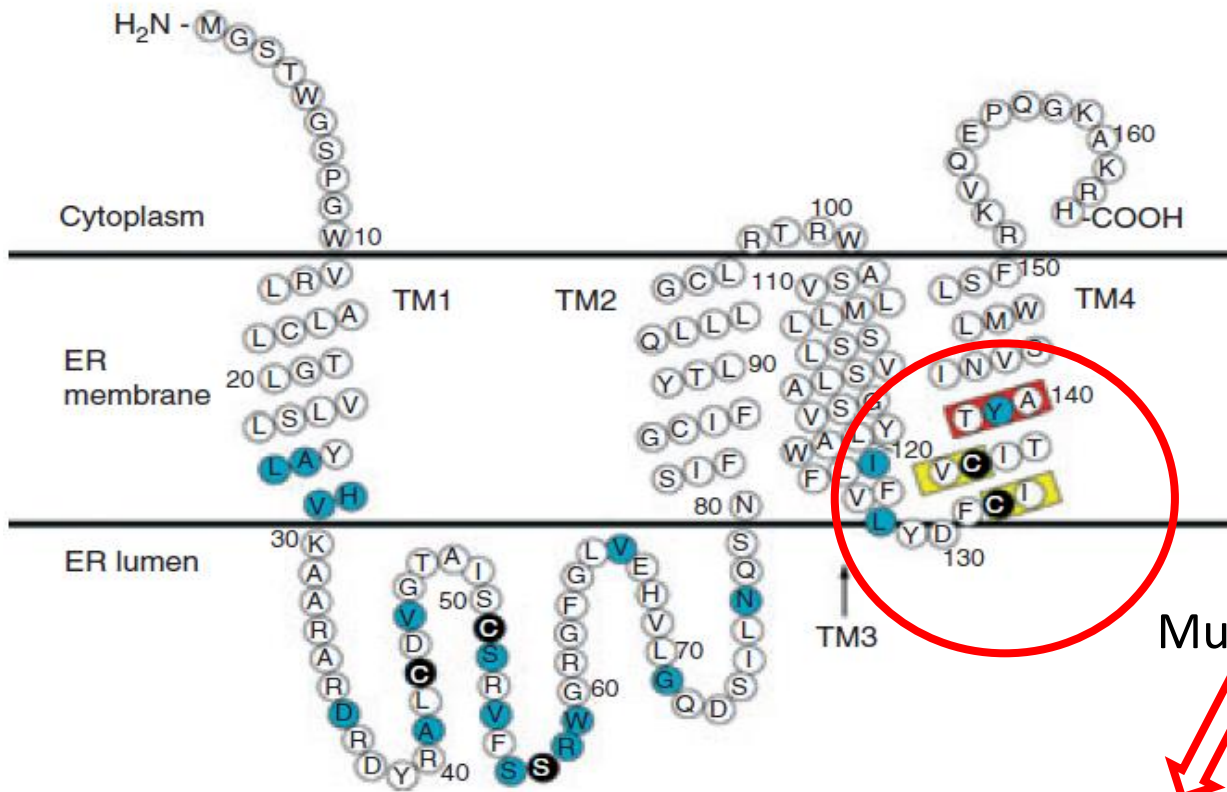
High behaviour variability from 1 site to the other

Naturally resistant to 1st generation AVK

Field occurrence of resistance to bromadiolone/difenacoum



Management of house mouse population



Mutation hot spot

AVK do not bind

Need rotation with end 2nd generation AVK

+

Other action mode

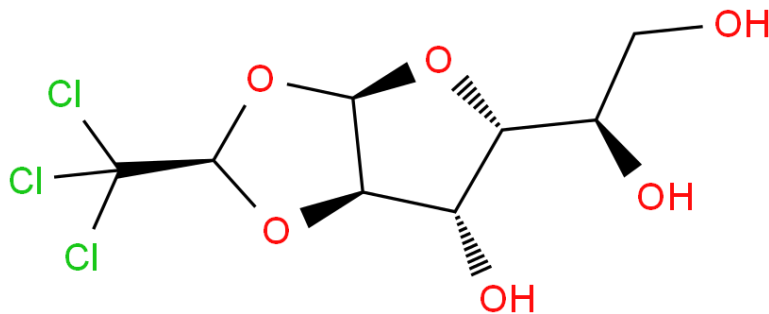
Management of house mouse population

Alphachloralose is a good active to manage house mouse pop

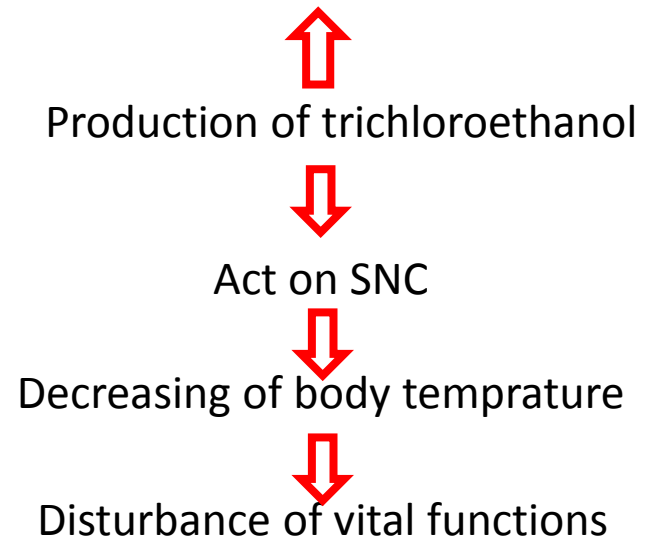
- ✓ Alphachloralose act quickly (4 to 7 hours)
- ✓ Very effective in all mice (suscpetible & resistant to AVK)
- ✓ Act on central nervous system
- ✓ Quick results
- ✓ No resistance described in rodents
- ✓ Good active in alternance with AVK in mice
- ✓ no accumulation in dead bodies (no secondary poisoning)

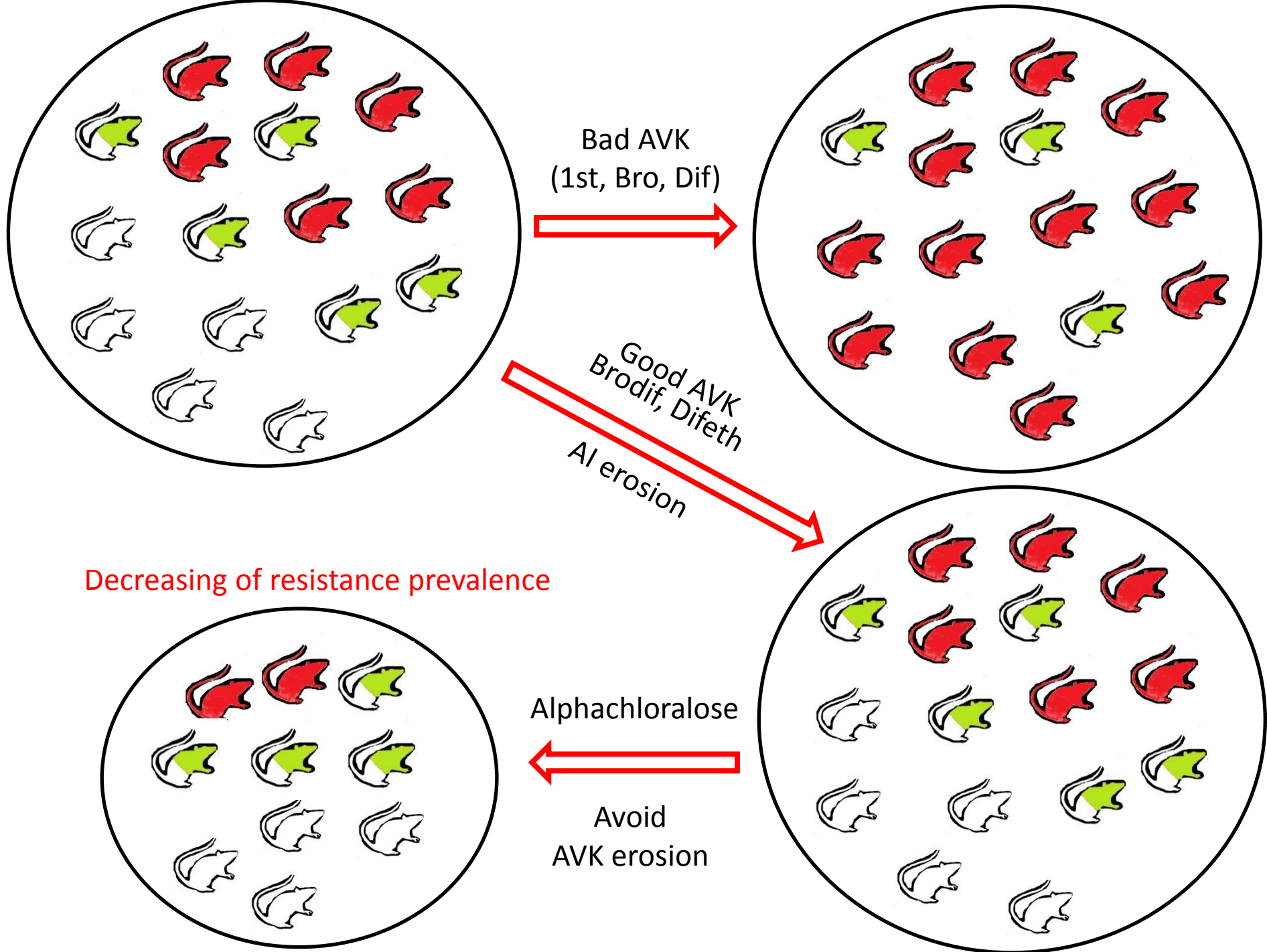


Alphachloralose formula



**High efficacy and no resistance
In Mice**



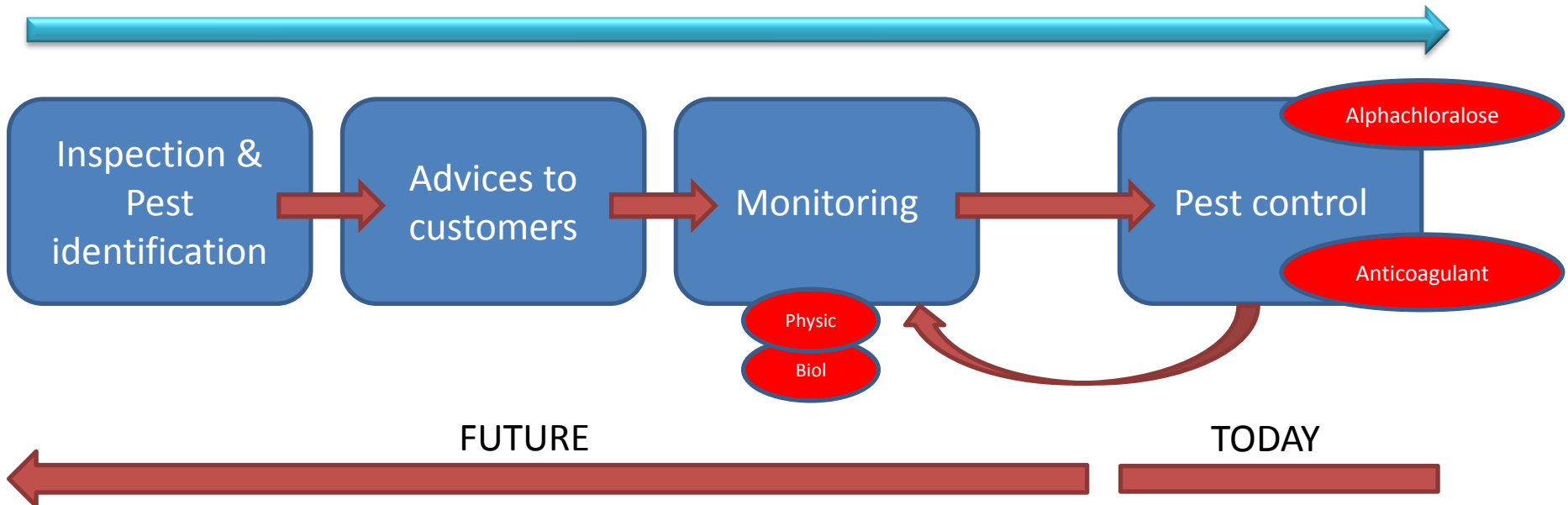




Conclusion: PCO challenge for the future

- Main challenge: *from pest control to pest management...*
- Diagnostic is an essential tool to bring added value to PCO activity
- Adding value before and after pest control
- To anticipate resistance development to use different action mode of bait

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Thank you !



*Scientific and Technical support
to Pest Management...*

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