Micro-fogging at the SEMC:

The theory, practice, and results of 25 years with our heads in the clouds

...of pyrethroids

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“Micro-fogging”

The small-scale use of pyrethroid-based aerosol insecticides to collect arthropods from cryptic, structurally complex or otherwise inaccessible micro-habitats and substrates
“Micro-fogging”

The small-scale use of pyrethroid-based aerosol insecticides to collect arthropods from cryptic, structurally complex or otherwise inaccessible micro-habitats and substrates

i.e.: “spray-n-suck”
“Micro-fogging”
“Micro-fogging”

Pyrethroid insecticides
History of micro-fogging
Uses/results
Observations/opinions
“Micro-fogging”

Pyrethroid insecticides

History of micro-fogging

Uses/results

Observations/opinions
Pyrethrum vs pyrethrin vs pyrethroid
Pyrethrum vs pyrethrino vs pyrethroid

Pyrethrum cinerariifolium

Pyrethrum coccineum
**Pyrethrum vs pyrethrin vs pyrethroid**

*Pyrethrum-cinerariifolium*

*Chrysanthemum*

*Tanacetum*

*Pyrethrum-coccineum*

*Chrysanthemum*

*Tanacetum*
Pyrethrum vs pyrethrin vs pyrethroid

pyrethrin
Pyrethrum vs pyrethrin vs pyrethroid

pyrethrin(s)
Pyrethrum vs pyrethrin vs pyrethroid

pyrethrin(s)
high invert toxicity
low vert toxicity
high lability
Pyrethrum vs pyrethrin vs pyrethroid

pyrethroid = synthetic pyrethrin
Pyrethrum vs pyrethrin vs pyrethroid

pyrethroid = synthetic pyrethrin
allethrin, bifenthrin, cyfluthrin, cypermethrin, cyphenothrin, deltamethrin, esfenvalerate, etofenprox, fenpropathrin, fenvalerate, flucythrinate, flumethrin, imiprothrin, λ-cyhalothrin, metofluthrin, permethrin, prallethrin, resmethrin, silafluofen, sumithrin, τ-fluvalinate, tefluthrin, etc. etc.
Pyrethrum vs pyrethrin vs pyrethroid
Pyrethrum vs pyrethrin vs pyrethroid

cypermethrin $L_{D_{50}} \approx 1 \text{ mcg/g}$ roaches

*Periplaneta americana* $\approx 1.5 \text{ g}$
Pyrethrum vs pyrethrin vs pyrethroid

cypermethrin $LD_{50} \approx 1 \text{ mcg/g roaches}$

$Periplaneta americana \approx 1.5 \text{ g}$

$496 \text{ g} \times 0.002 = 0.992 \text{ g} = 992,000 \text{ mcg}$

$992,000 \text{ mcg} / (1 \text{ mcg/g} \times 1.5 \text{ g}) = 661,333$

$661,300 \times 0.5 = 330,666 \text{ dead roaches!}$
Pyrethrum vs pyrethrin vs pyrethroid

cypermethrin $LD_{50} \approx 250$ mg/kg mammals
Zack Falin $\approx 80$ kg
Pyrethrum vs pyrethrin vs pyrethroid

cypermethrin LD_{50} \approx 250 \text{ mg/kg mammals}

Zack Falin \approx 80 \text{ kg}

80 \text{ kg} \times 250 \text{ mg/kg} = 20,000 \text{ mg} = 20 \text{ g}

20 \text{ g} / 0.992 \text{ g/can} = 20.1 \text{ cans}

20.1 \text{ cans} \times 0.7 \text{ l/can} = \textbf{14.07 liters of RAID!}

ACTIVE INGREDIENTS:

Imiprothrin ..................... 0.100%
Cypermethrin .................. 0.100%

OTHER INGREDIENTS: ........ 99.800%

Contains petroleum distillates

NET WT. 17.5 OZ.
(1 LB. 1.5 OZ.) 496 g
**Pyrethrum vs pyrethrins vs pyrethroids**

cypermethrin $LD_{50} \approx 250 \text{ mg/kg mammals}$

Zack Falin $\approx 80 \text{ kg}$

$80 \text{ kg} \times 250 \text{ mg/kg} = 20,000 \text{ mg} = 20 \text{ g}$

$20 \text{ g} / 0.992 \text{ g/can} = 20.1 \text{ cans}$

$20.1 \text{ cans} \times 0.7 \text{ l/can} = \mathbf{14.07 \text{ liters of RAID!}}$

[in reality, the other 99.8% is likely more toxic]
**Pyrethrum vs pyrethrin vs pyrethroid**

cypermethrin $LC_{50} \approx 82$ mcg/l trout
*Pyrethrum vs pyrethrin vs pyrethroid*

Cypermethrin $\text{LC}_{50} \approx 82 \text{ mcg/l trout}$

+ 100 trout +

= 50 dead trout
**Pyrethrum vs pyrethrin vs pyrethroid**

“Toxicity Take-homes”

pyrethroids and lentic habitats don’t mix
Pyrethrum vs pyrethrin vs pyrethroid

“Toxicity Take-homes”
pyrethroids and lentic habitats don’t mix
low toxicity ≠ no toxicity
Pyrethrum vs pyrethrin vs pyrethroid

“Toxicity Take-homes”
pyrethroids and lentic habitats don’t mix
low toxicity ≠ no toxicity
Pyrethrum vs pyrethrin vs pyrethroid

“Toxicity Take-homes”
pyrethroids and lentic habitats don’t mix
low toxicity $\neq$ no toxicity
History of micro-fogging
History of micro-fogging

G. Kuschel

History of micro-fogging

1978

G. Kuschel  S. Peck

History of micro-fogging

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RAID® at the SEMC: uses & results
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700 collecting events
16 countries
25 years
RAID® at the SEMC: uses & results

700 collecting events
16 countries
25 years
37,000+ specimens
RAID® at the SEMC: uses & results

700 collecting events
16 countries
25 years
37,000+ specimens
RAID® at the SEMC: uses

“classic” scenario
RAID® at the SEMC: uses

“classic” scenario

splintered trees
RAID® at the SEMC: uses

“classic” scenario

splintered trees

hollow trees
RAID® at the SEMC: uses

“classic” scenario

splintered trees

hollow trees

tree bark/boles
RAID® at the SEMC: uses

“classic” scenario

splintered trees
hollow trees
tree bark/boles
“difficult” plants
RAID® at the SEMC: uses

“classic” scenario

splintered trees

hollow trees

tree bark/boles

“difficult” plants

root masses
RAID® at the SEMC: uses

“lazy berlese” scenario
RAID® at the SEMC: uses

“lazy berlese”
scenario
shorelines
RAID® at the SEMC: uses

“lazy berlese” scenario
shorelines
damp substrates
RAID® at the SEMC: uses

“lazy berlese” scenario

shorelines
damp substrates
submerged debris
RAID® at the SEMC: uses

“lazy berlese” scenario

shorelines
damp substrates
submerged debris
RAID® at the SEMC: uses

“lazy berlese” scenario

shorelines
damp substrates
submerged debris
flood debris
RAID® at the SEMC: uses “slow man’s net” scenario
RAID® at the SEMC: uses

“slow man’s net”
scenario
vegetation
RAID® at the SEMC: uses

“slow man’s net” scenario

vegetation
treefall litter
Parting observations and opinions

Formulation? Meh. Unscented? Yeah!
Parting observations and opinions

Formulation? Meh. Unscented? Yeah!
Use a heavy-weight sheet & don’t forget your machete
Parting observations and opinions

Formulation? Meh. Unscented? Yeah!
Use a heavy-weight sheet & don’t forget your machete
Be discrete
Parting observations and opinions

Formulation? Meh. Unscented? Yeah!
Use a heavy-weight sheet & don’t forget your machete
Be discrete
Think before you spray
Parting observations and opinions

Formulation? Meh. Unscented? Yeah!
Use a heavy-weight sheet & don’t forget your machete
Be discrete
Think before you spray
Keep at it
The End!