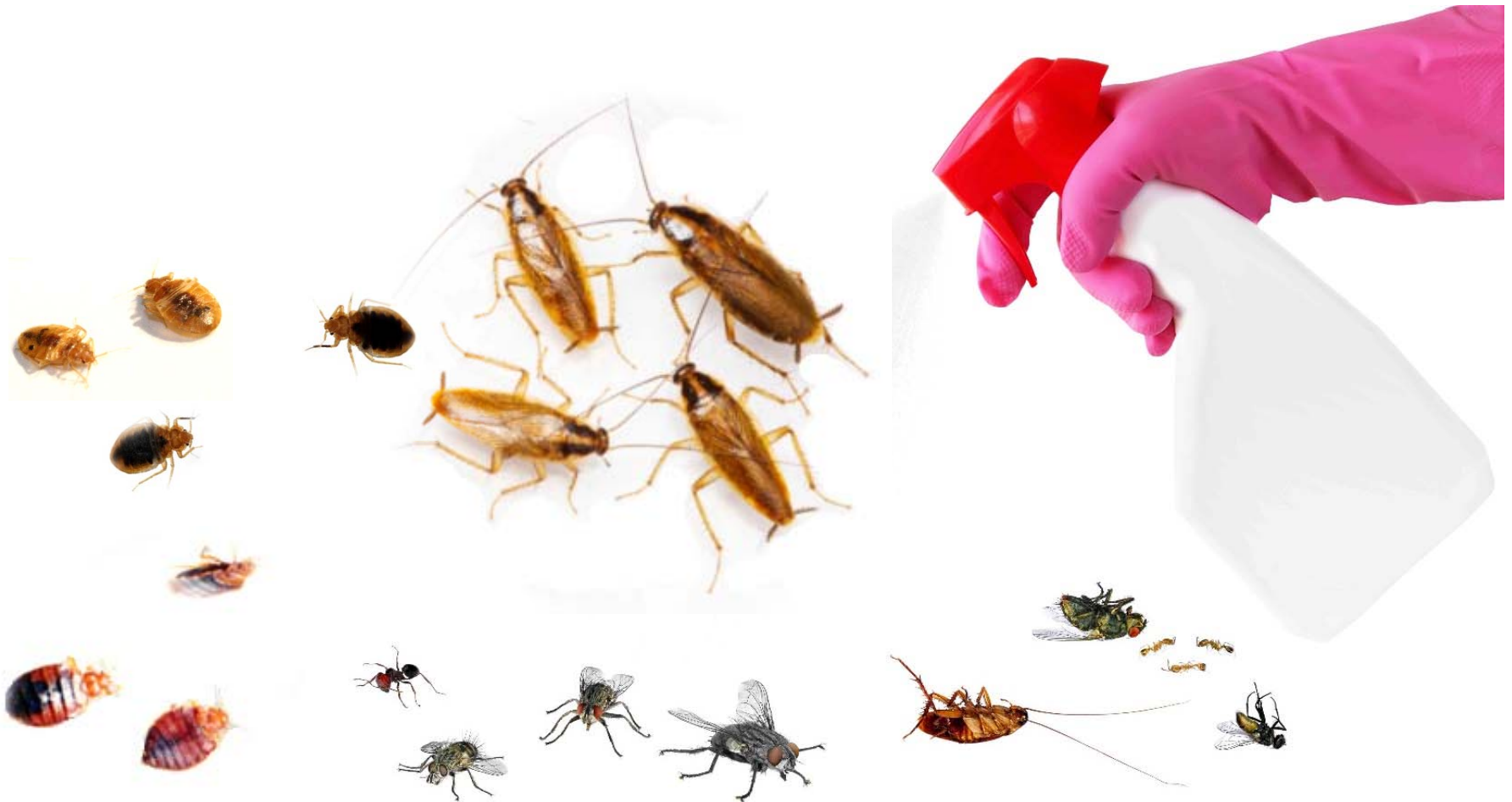


Extreme Pesticide Use in Response to *Cimex lectularius* and *Blattella germanica* Infestations





COLLEGE OF AGRICULTURE
AND LIFE SCIENCES
COOPERATIVE EXTENSION
Arizona Pest Management Center



NIFA Applied Research and Development Program

- Improve pest management in housing
- Reduce risks associated with pests and pest management practices

Gouge^{*}, Li^{*}, Nair^{*}, Wierda^{*},
Drake^{*}, Stock^{*}, & Fournier^{*}

Inner-city case study in AZ public housing

- Residents are 62+ senior and/or disabled
- Independent living but.....
- Low income

\$ Per-Capita Income by Zip

(1)	(2)	(3)	(4)	(5)	Maricopa County
43,000	9,600	12,000	11,400	29,000	27,800

Sites all >50 years old

4



1) 156

2) 108

3) 120

4) 112

5) 116

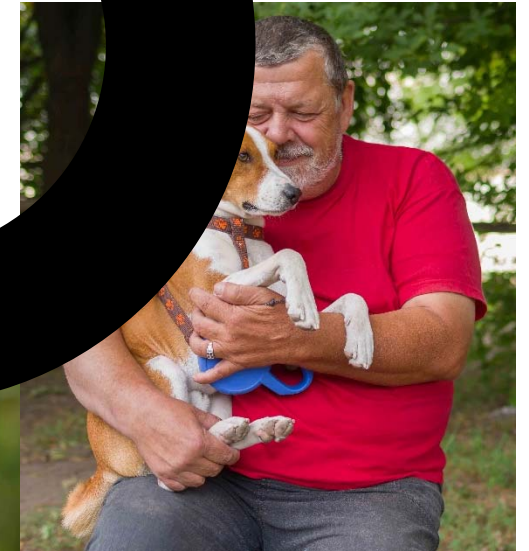
612 units



Pest incidence &

5

- ... (p... & social
- ... problems in ... areas)
- ... sanitation and ...
- ...
- ...
- ... disability
- ... use



Whole building assessment

6

- ❑ Visual inspection
- ❑ Sticky monitoring traps (2 in kitchen)
- ❑ Bed bug volcano traps (2 under or near bed or sleeping area)
- ❑ OTC pesticide products
- ❑ Sanitation and clutter score
- ❑ Professional pest management



Pest and pest management issues

7

- ❑ German cockroaches
- ❑ Bed bugs
- ❑ Poor low-bid PM service
- ❑ Hazardous resident pesticide use



German cockroaches *Blattella germanica*

8

- 29-100% units





Bed bugs

Cimex lectularius

10

□ 3-15% units



Poor low-bid pest management service

11

- ❑ Initial contract cost $< \$0.80/\text{unit}/\text{month}$
- ❑ Inaccurate pesticide use reporting
- ❑ Failure to fulfill contract specifications
- ❑ Poor contract specifications

FAILURE



Pesticides applied by residents

12

- ❑ Retail (OTC & internet), illicit, and legacy
- ❑ 26-60% units with pesticide products
- ❑ Highest OTC (site 1) use had no correlation with pest levels



Pesticides applied by residents

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- ❑ Pyrethrins/pyrethroid
- ❑ Phenylpyrazole
- ❑ Borates
- ❑ Diatomaceous earth/silica
- ❑ Amidinohydrazone
- ❑ Organophosphates
- ❑ Carbamates
- ❑ Second generation anticoagulant

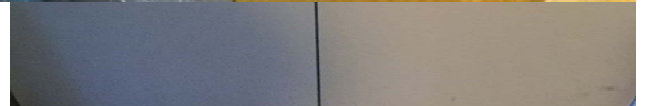
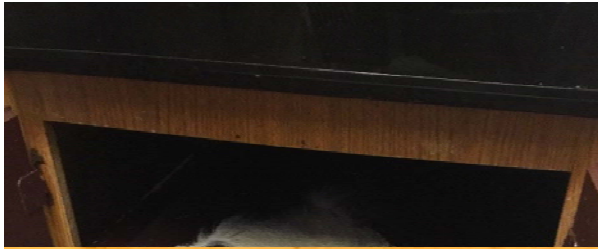


Pesticides applied by residents

14

- ❑ Off-label
- ❑ Excessive
- ❑ No PPE
- ❑ Hazardous material cleanup (\$5K)





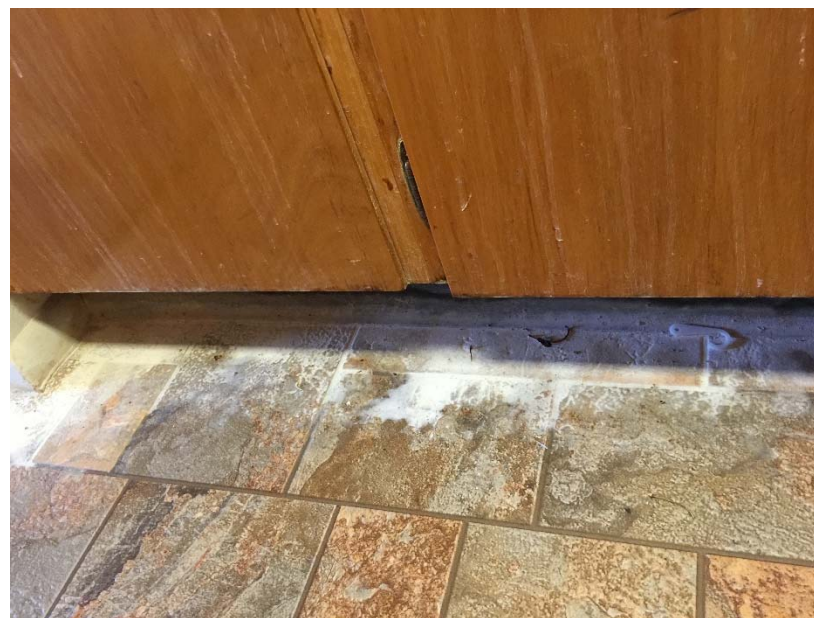
Kitchen floor pesticide residue analysis

Allethrin
Bifenthrin
Chlorpyrifos
Cypermethrin
DDT
Deltamethrin
Diazinon
Esfenvalerate
Fipronil
Malathion

Permethrin
Phenothrin
Cyfluthrin
Cyhalothrin
Dichlorvos
Piperonyl
Butoxide
Prallethrin

1 60,000 X Cypermethrin
GC/MS detectable levels

????



Site 1 highest resident pesticide use did NOT have the highest pest incidence

17

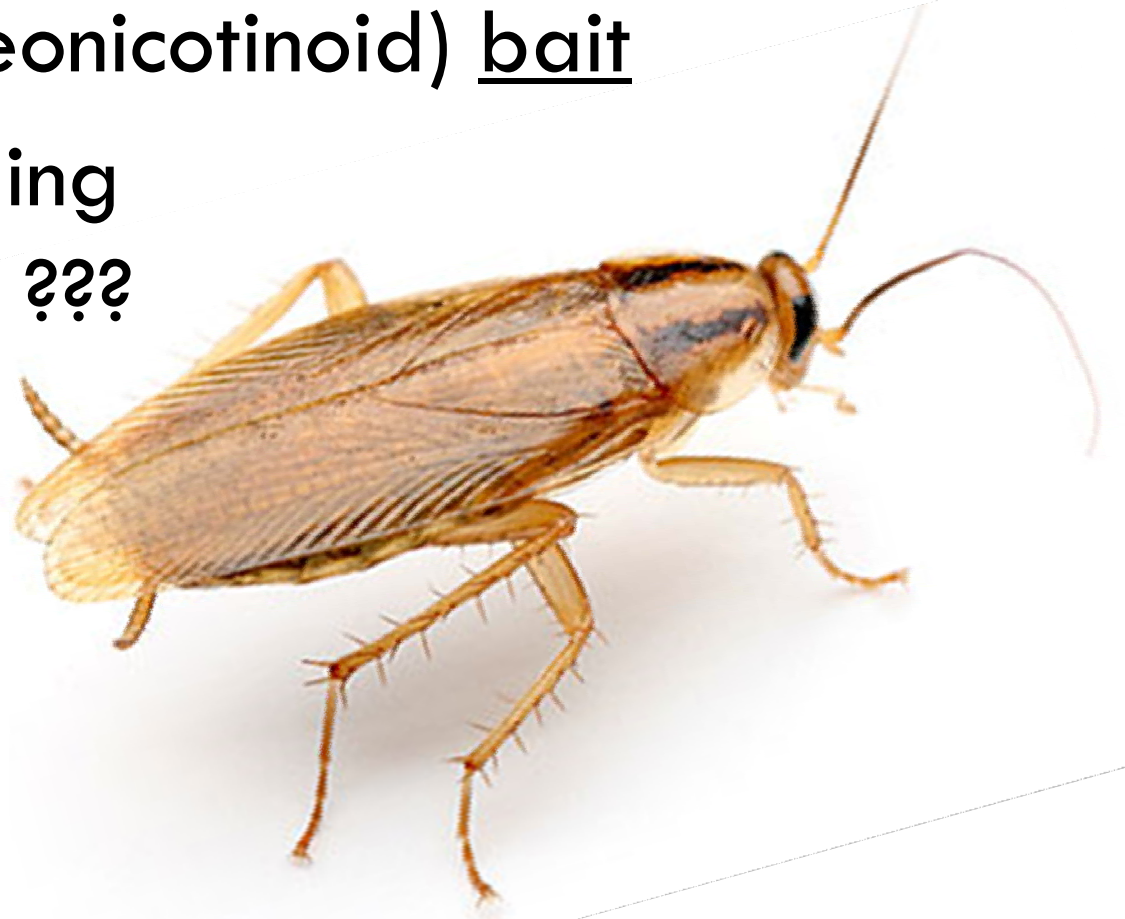
- Most pest complaints
- Youngest average age
- Lowest sanitation scores
- Not the most cluttered
- High psychiatric illness incidence
- More able-bodied
- Highest % women
- Highest % smokers
- Lowest REAC
- Highest per capita income area
- Highest bed bugs
- **Considered to house the most feisty residents**



Let's get rid of the cockroaches

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- Rotation of fipronil (phenylpyrazole) and dinotefuran (neonicotinoid) bait
- Policies regarding waste disposal ???
- In-home help



Let's get rid of the bed bugs

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- Extensive prep is **impossible** for residents
- Service protocol to include:
wall void CimeXa,
rotation of dual MOA
(pyrethroid + neonicotinoid),
vacuum, dryer use
- Stopped resident relocation
- Effective 2 week unit
turn-over protocol ???



Let's get real

20

- ❑ Residents not asked to change their living habits
- ❑ Huge reduction in bed bug and German cockroach levels (>90%)
- ❑ Increase in PM costs



Satisfaction 1 = completely dissatisfied with pest levels 5 = very satisfied

21

- Before residents - 1.71
- Before staff - 1.0
- Now residents - 4.15
- Now staff - 4.8

**2020 - 1 in 6
Americans
65 or older**

