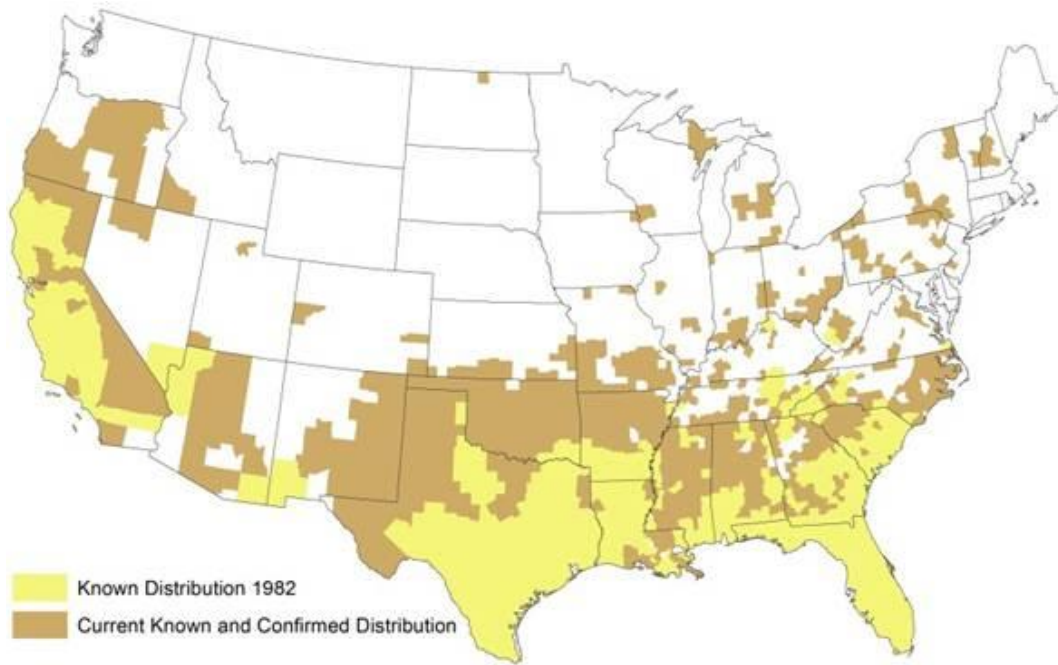


# Feral Hog Management (Baiting)

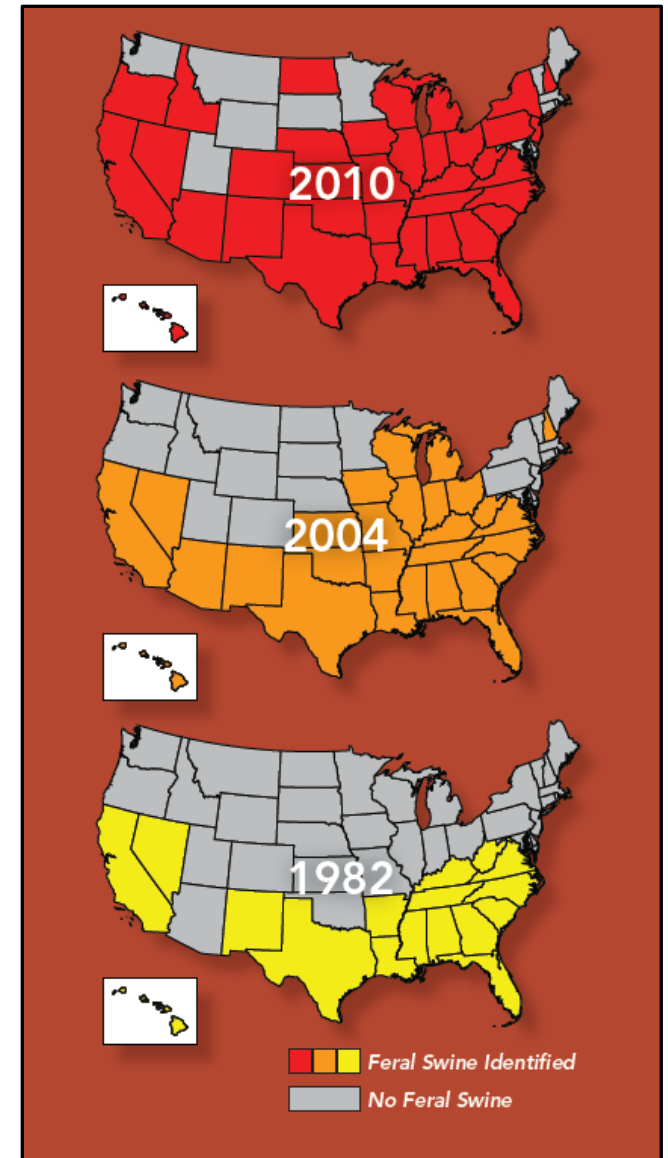


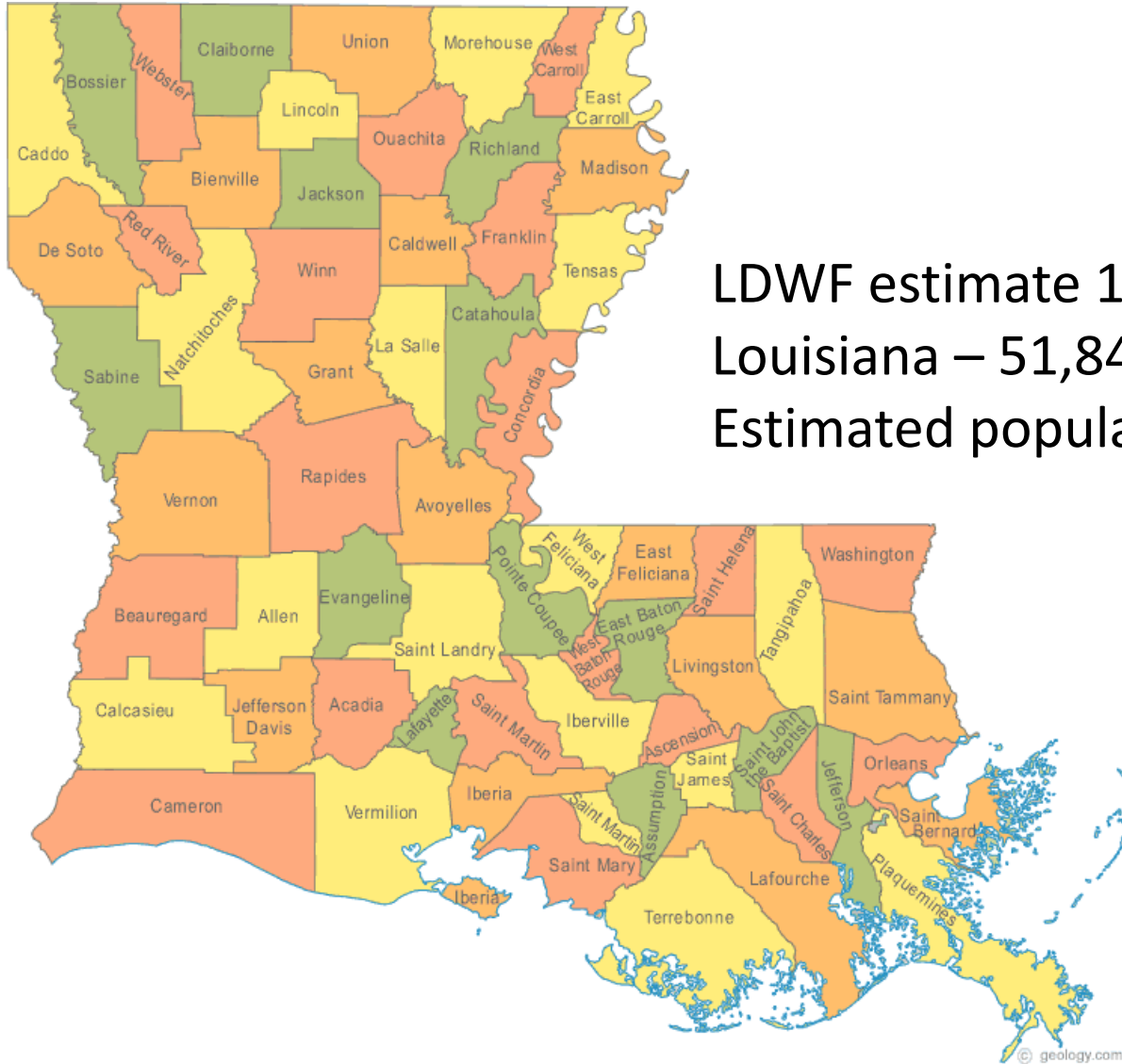
G.T. Gentry  
Bob R. Jones - Idlewild Research Station  
Dean Lee Research Station

# Distribution



(USDA/APHIS, 2013)





LDWF estimate 10 pigs / square mile  
 Louisiana – 51,840 square miles  
 Estimated population – 518,840 pigs

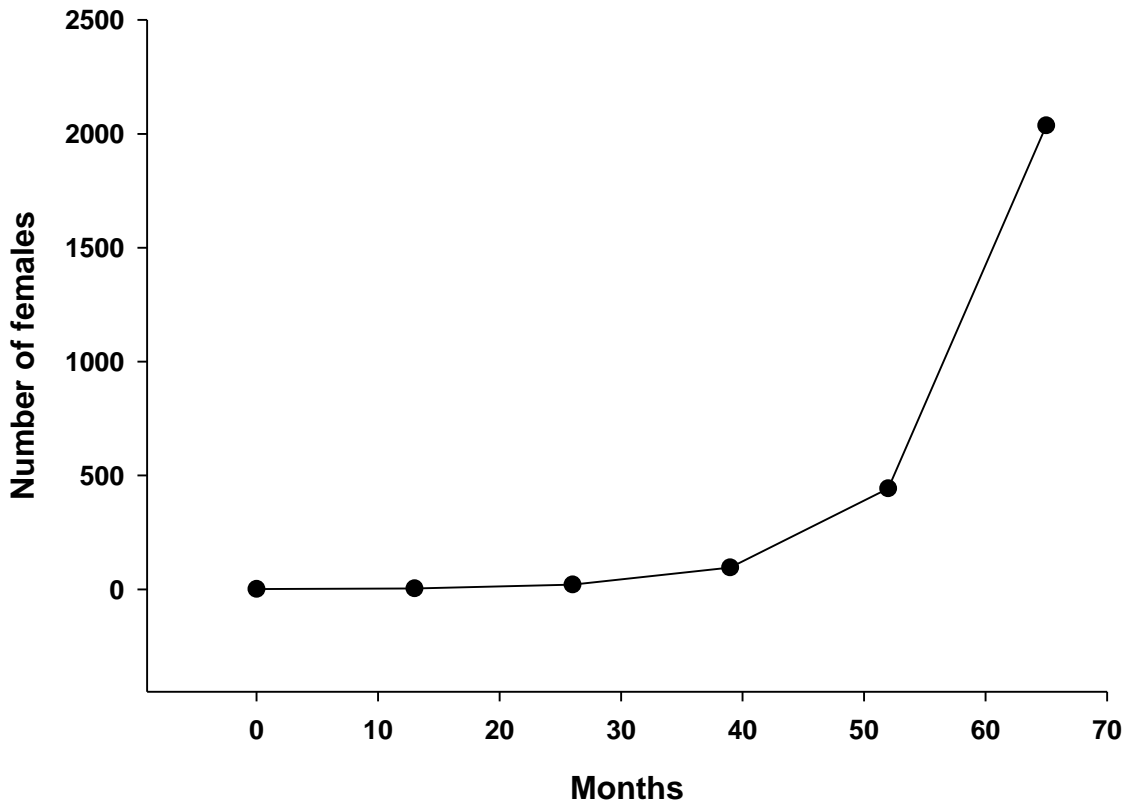
# Reproduction

- Sows average 6 piglets per litter
- Gestation is 115 days allowing 2 litters per year (typically 1.5 litters per year)
- Piglet survival is nearly 100%
- Sexual maturity occurs around 6 months
- First litter typically at 13 months



# Reproductive Potential (Females Only)

- Assumptions:
  - Farrowing at 13 months of age
  - 1.5 litters per year
  - 80% piglet survival
  - 95% adult survival



# Economic Impact

- Estimated total impact of \$1.5 B nationally
- Texas
  - Agricultural damage estimated at \$7,515 per land owner
  - Out of pocket repair and control estimated at \$2,631 per land owner



(Bodenchuk et al., 2014)

# Direct Impact



(Whitehead, personal communication)

# Soybean Damage





# Milo Damage



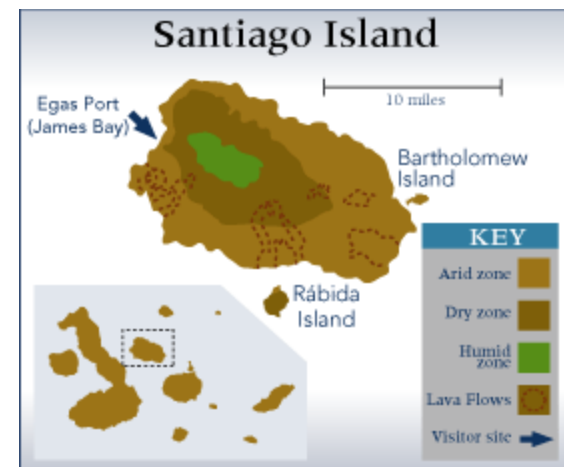
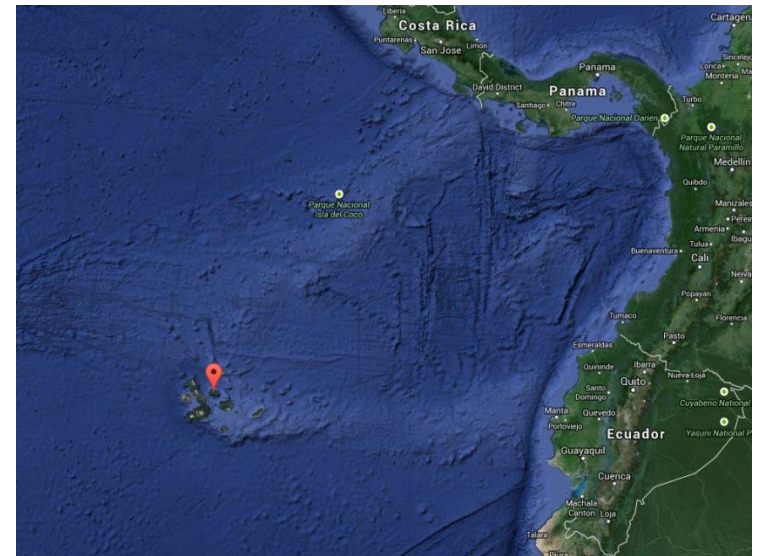
# Current Control Options

- **Trapping** – most common control utilized; box and corral
- **Snares** – not as common; rough terrain; not legal in all states
- **Shooting and Hunting** – aerial, sport, night and Judas pig



# Eradication Proof of Concept

- 18,000 pigs removed
- Methods
  - Hunting
  - Poisoning (1080, warfarin)
  - Traps
  - Snares
    - Poisoning was 11 times cheaper than shooting and 80 times cheaper than trapping
- 30 Year campaign

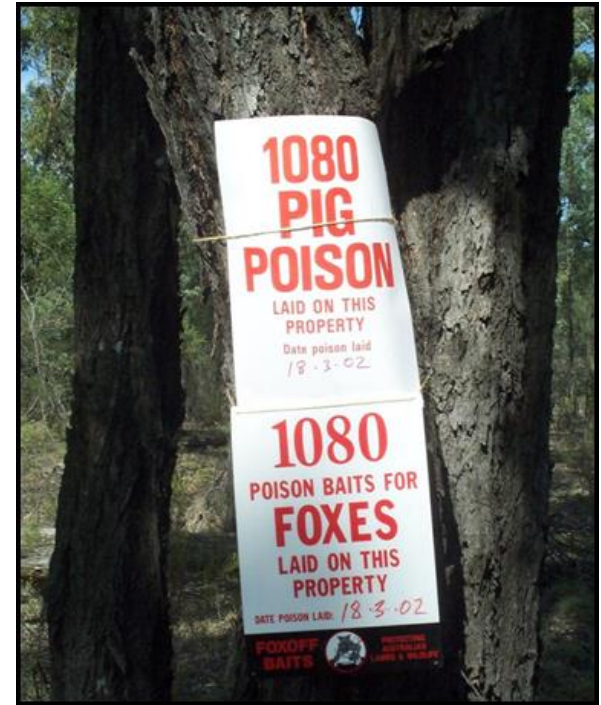
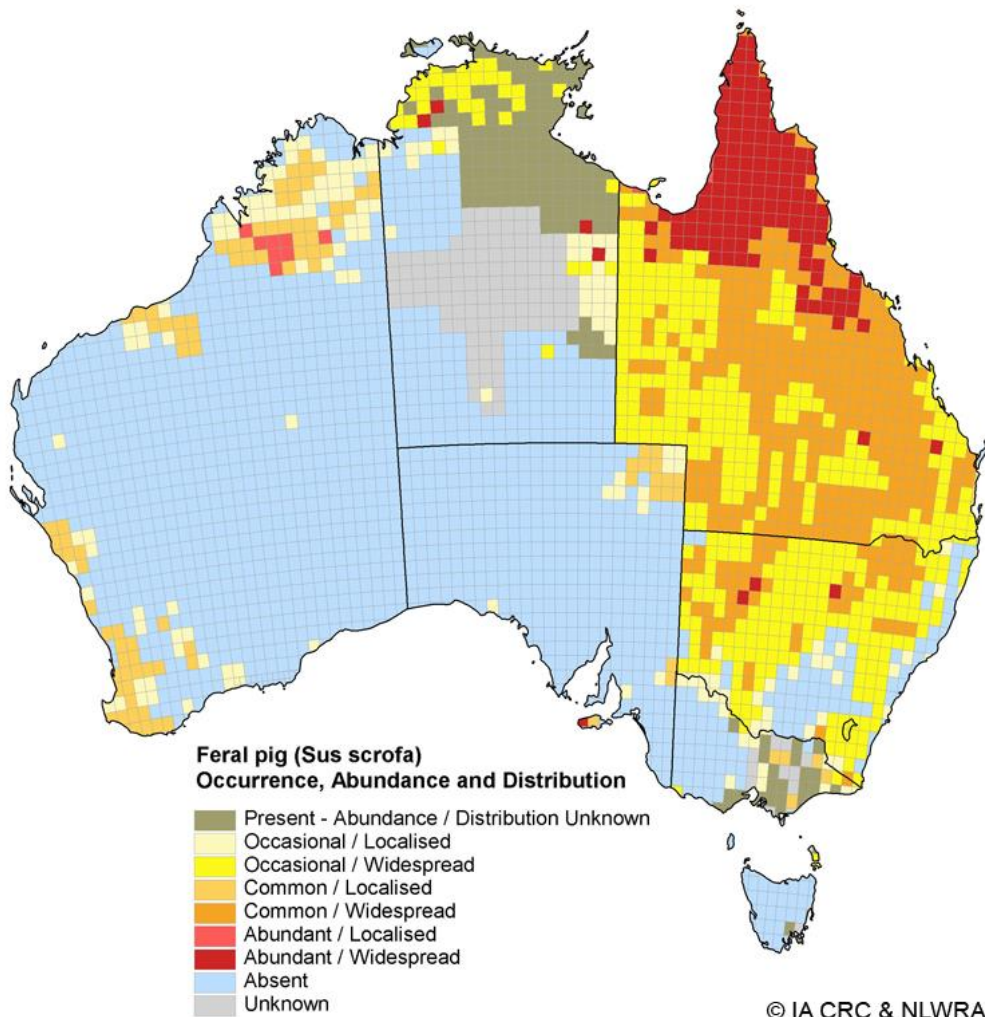


(Coblentz and Baberr, 1987; Cruz et al., 2005)

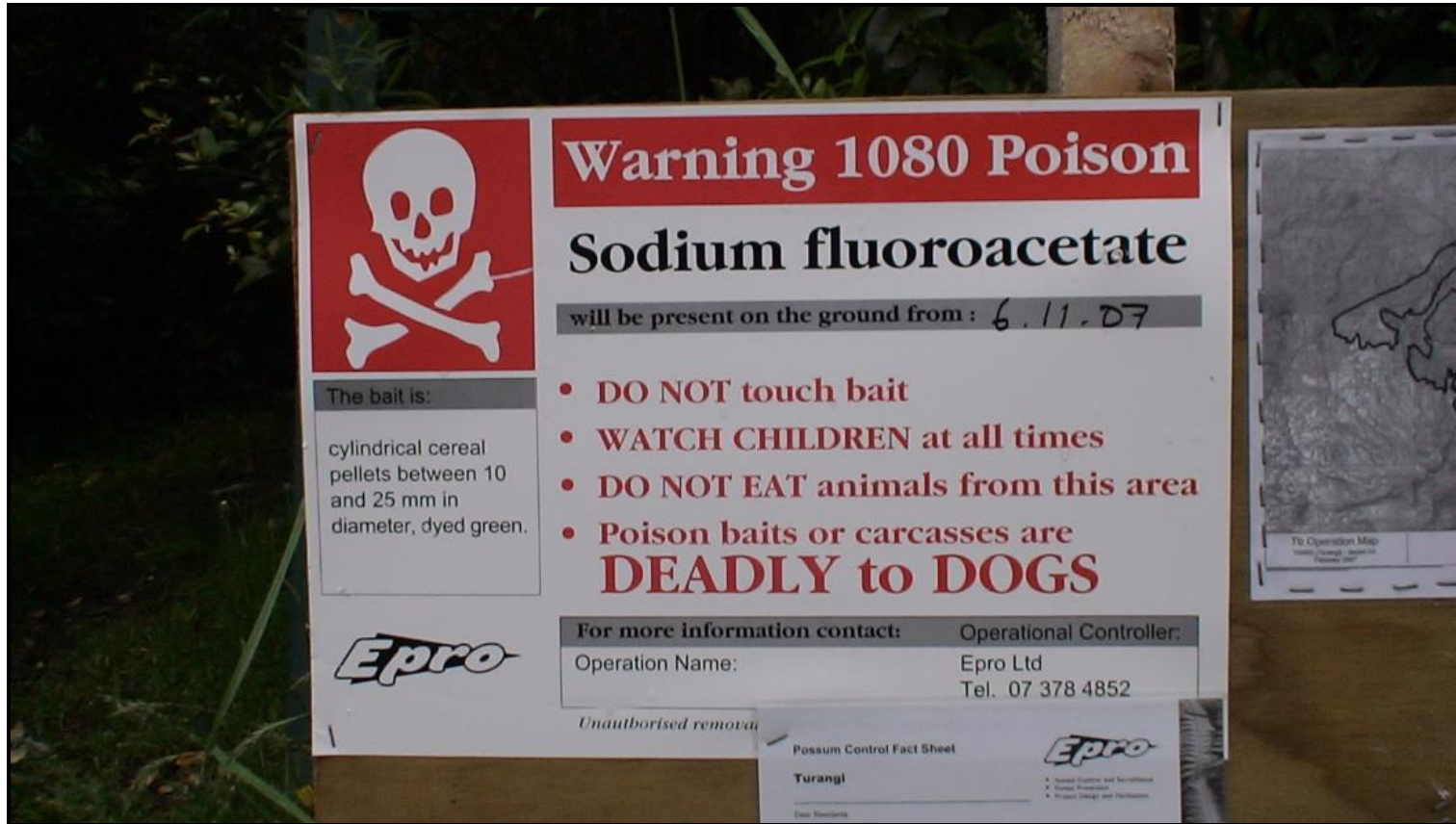
# Toxicant Attributes

- Effective against wild pigs
- Relatively safe for humans
- Target specific
- Publicly acceptable
- Humane death





Field trials in Queensland, New South Wales and South Australia achieved  $78 \pm 4\%$  population or activity reduction in 2004 using PIGOUT® baiting



In 1972 the EPA cancelled all uses of sodium fluoroacetate in the US , however, in 1985, the restricted-use "toxic collar" was approved

# Sodium Nitrite

- Used as a food preservative
- Antidote
  - Cyanide poisoning
- Humans more tolerant than pigs



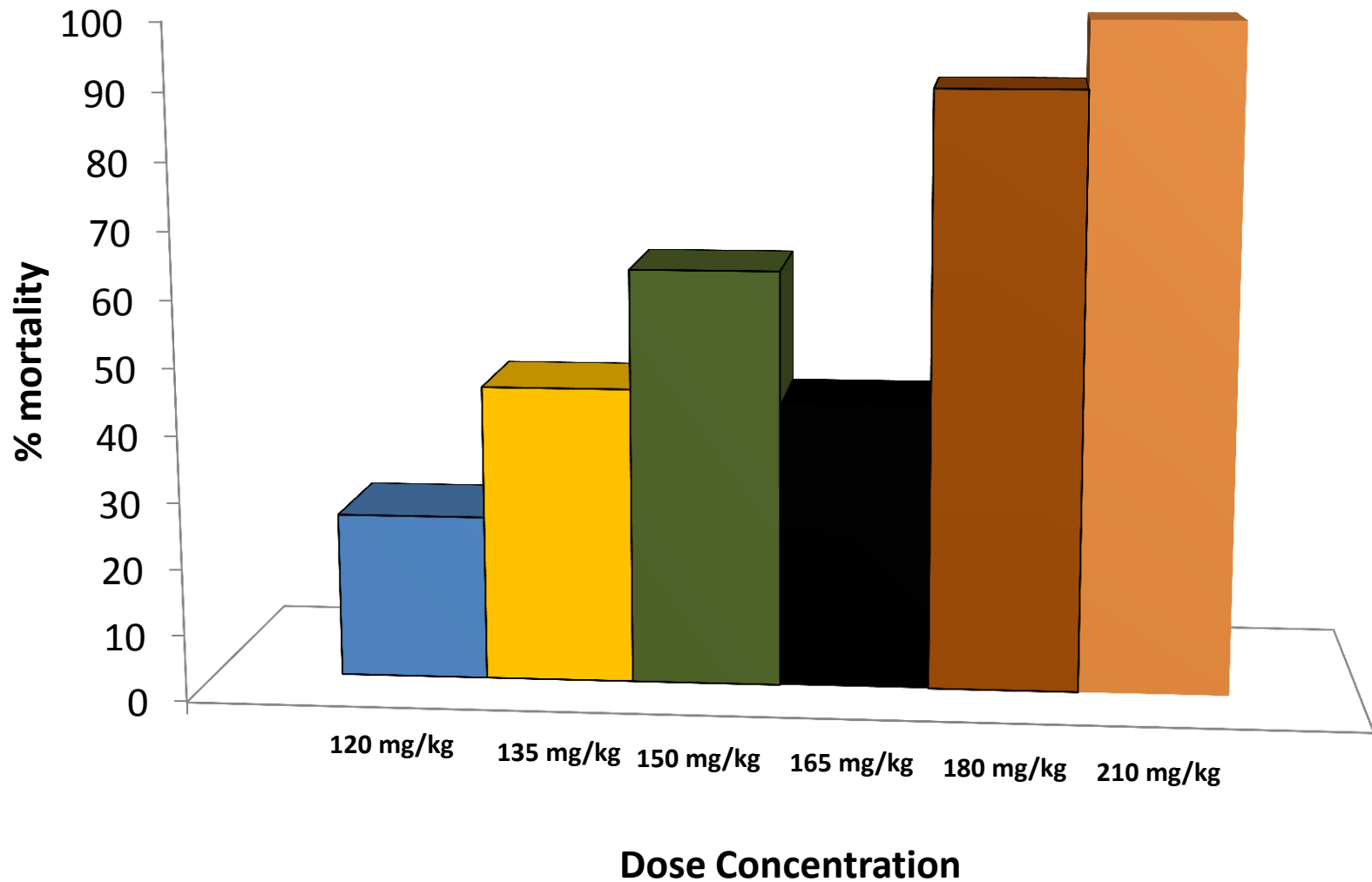
# AgCenter Study Objectives

- To determine effective lethal dosage of sodium nitrite
- Develop an effective delivery medium
- Develop an effective and selective delivery system

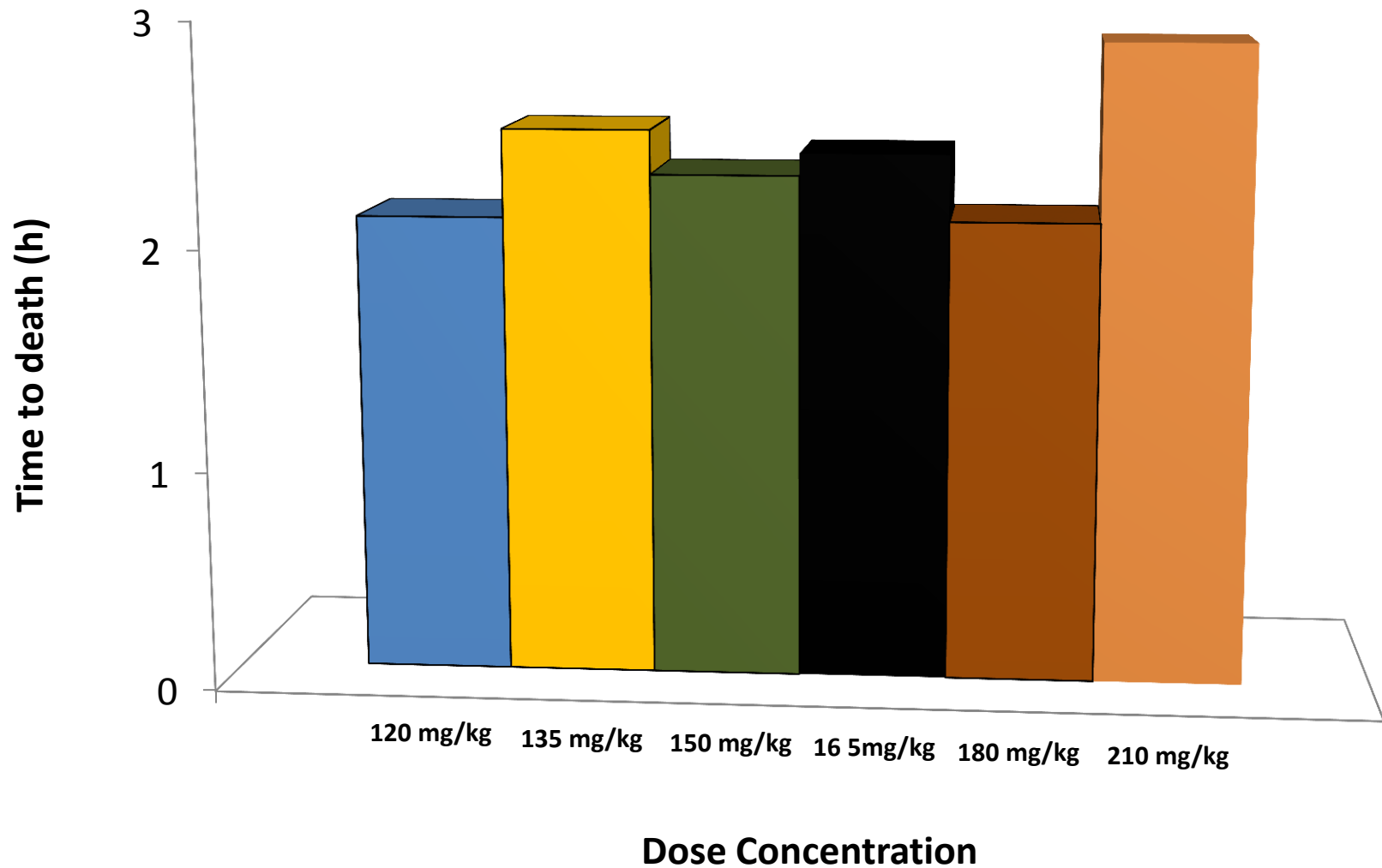




# Effect of Sodium Nitrite Concentration on Mortality Rate in Feral Pigs



# Effect of Sodium Nitrite Concentration on Time to Death in Feral Pigs



# Effect of Sex and Body Weight on Sodium Nitrite Gavage Outcome in Feral Pigs<sup>1</sup>

---

	<u>Expiring</u>		<u>Non-Expiring</u>	
Sex	Male	Female	Male	Female
Percent	69%	52%	31%	48%
Average body weight (lb)	55	79	86	49
Weight range (lb)	33 - 108	37 - 121	49 - 185	29 - 99

---

<sup>1</sup> Across all sodium nitrite concentrations (120 mg/kg, 135 mg/kg, 150 mg/kg, 165 mg/kg and 180 mg/kg).

# LD<sub>90</sub> Determination

- Based on probit analysis LD<sub>90</sub> is 182 mg/kg
- Will be utilized on bait development
  - Currently we are working with a bait containing 8 g of sodium nitrite (can be doubled)
  - Would be capable of delivering enough sodium nitrite to kill a 97 lb pig if only one bait is consumed
  - If used on pigs from toxicant study, 79% would have succumb

# Delivery Medium

- Currently there are no labeled toxicants in the US for feral swine
- Hog Gone<sup>®</sup> are 200 g baits containing 10 g of sodium nitrite are available in Australia



# Preference Studies



- Fruity Flavors
- Whole Corn
- Flavored Corn
- Fish
- Earth Worms
- Acorns
- Taste Masking Compounds

Feral Pigs prefer ( $P=0.004$ ) whole shelled corn to white acorns  
Feral pigs tended ( $P=0.10$ ) sweet corn to salty corn in the bait form

# Delivery System



# Non-Target Impacts

- Delivery – hand placed grain based baits with no delivery system
- 90% of baits removed at 72 hours
  - 51% Raccoons
  - 22% Wild Pigs
  - 20% Collared peccaries



(Campbell et al., 2006)



# Predicting Methemoglobin Reductase Levels of Relevant Non-Targets



$$Y = 0.377x - 18.843$$

$$R^2 = 0.9231$$



# Collaborators

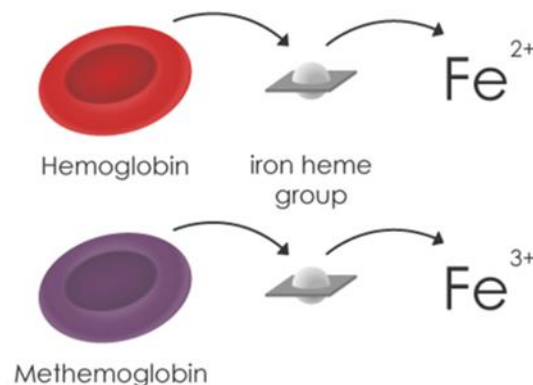
- Dearl Sanders – Bob R Jones Idlewild Research Station
- Randy Price – Dean Lee Research Station
- Zhijun Liu – School of Renewable Resources
- Jim LaCour – LDWF
- John Finley – Department of Food Science

# Sponsor



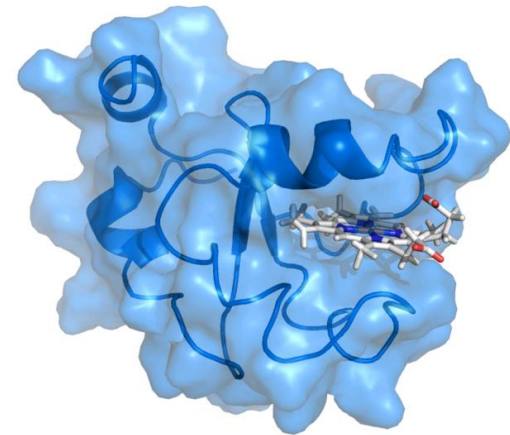
# Sodium Nitrite and Methemoglobinemia

- Occurs when RBC contain methemoglobin levels greater than 1%
- Results from presence of iron in the ferric form instead of ferrous form
- Symptoms: skin color (15%), cyanosis (15-20%), headache and weakness (25-50%), delirium (50-70%) and death (>70%)



# Methemoglobin Reductase (cytochrome b5 reductase)

- As a percentage of human activity
  - Humans 100%
  - Pigs 27%
  - Horses 63%
  - Cattle, cats and goats 90%
  - Dogs 114%
  - Sheep 150%
  - Rabbit 452%



Low MetHb reductase in pigs together and low nitrite reductase levels in the saliva provide a metabolic rationale for their physiological sensitivity to nitrite toxicity.