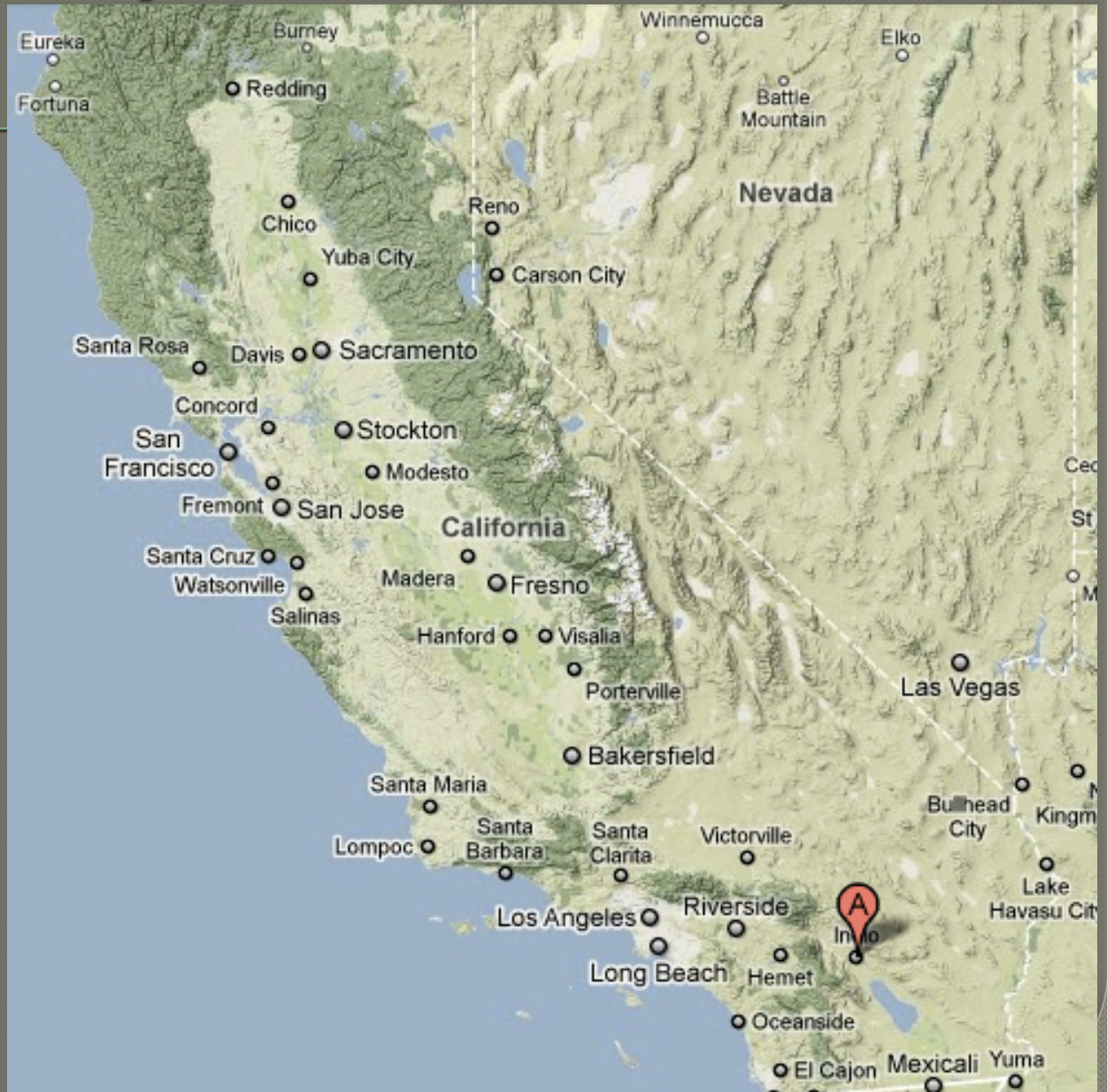


Eye Gnat Control in the Coachella Valley

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Coachella Valley

Located in
Riverside
County in
Southern
CA



Unique aspects of Coachella Valley

Surrounded by mountains

Very hot! (>100°F
3 months)

Windy

Over 120 golf courses

95% of US dates grown here

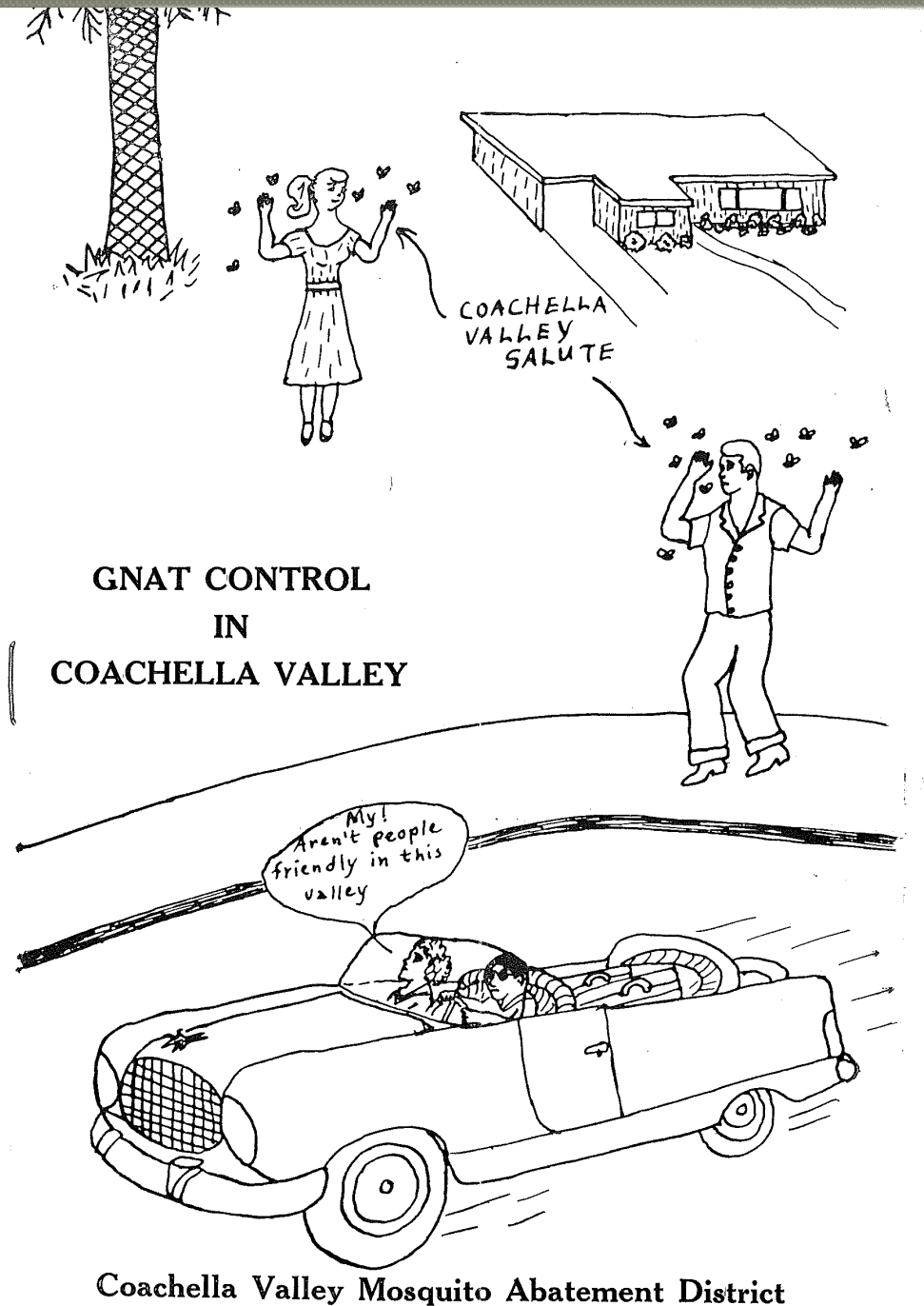
Only 2"-4" annual precipitation



Date Palms



District founded in
1928 to deal with
eye gnats



Eye Gnats

- Several species in the genus *Hippelates* with the species *collusor* most abundant
- Feed on moist secretions from eyes, ears, mouth, nose
- Highly pestiferous
- Proven vectors of the spirchaete that causes yaws in people
- Implied in transmission of the bacteria that causes conjunctivitis (pink eye), staphylococcal and streptococcal bacteria in tropical regions
- In 1927 schools in Coachella Valley were **closed for 2 months** because of the severity of pink eye cases

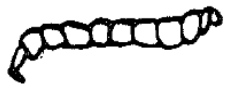
Eye Gnat Biology

LIFE HISTORY OF EYE GNAT



EGG (X30)

Each female gnat may lay 32-42 eggs in freshly disked, damp soil. Egg is barely visible to eye and hatches in approximately 3 days.



LARVA (X9)

Larva develops in 10-15 days in hot summer, 20-35 days in spring and fall.



PUPA (X8)

Pupal period lasts about 6 days in summer, longer in spring and fall.



ADULT (X6)

Some adults live through the winter; during hot weather life is short. Total period required for development from egg to adult:- summer, 14-21 days; spring and fall, 30-50 days.

In 1949 researchers with the District, Ernest Meyers and Ernest Tinkham, showed eye gnats breed almost exclusively in freshly tilled soil

Great implications for eye gnat control



Eye gnat control strategies

- **1928 -36:** Some baited traps used. Traps used rotten meat bait that residents said they would rather have the eye gnats than the bait

Some fogging also attempted but not with much success

Control Efforts

- **1948-1955:** Regular surveillance performed with newly designed “Tinkham traps”

Soil larvicide program started using primarily aldrin, DDT and similar pesticides

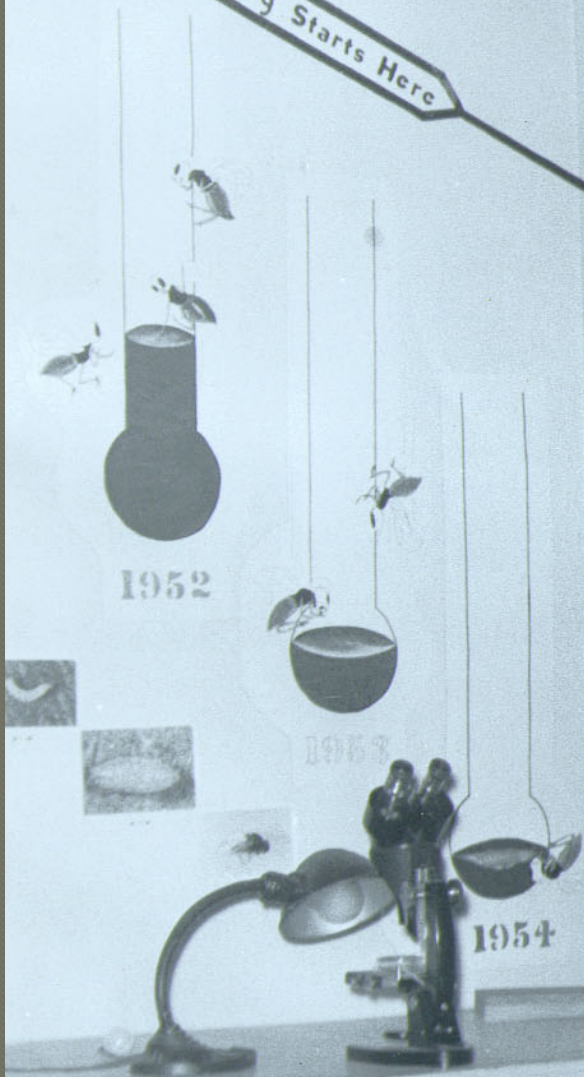


Tinkham Trap

Applying larvicide to soil



Soil Larvaciding Starts Here

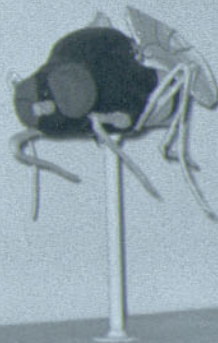


Pink Eye Cases Decrease As Gnats Decrease

YEARS	GNATS TRAPPED	COACHELLA SCHOOL		INDIO SCHOOLS	
		PINK EYE ENROLLMENT CASES	PINK EYE ENROLLMENT	PINK EYE ENROLLMENT CASES	PINK EYE ENROLLMENT
1951	367,961	1119	450	342	1644
1952	217,891	322	504	170	1722
1953	199,461	278	813	105	1840
1954	115,623 <small>FROM 7 BAIT TRAPS</small>	208	814	108	2028

**4 MILLION
GNATS
CAPTURED**

IN BAIT TRAPS
3 MILLION ARE FEMALES
EACH FEMALE CAPABLE OF
LAYING 14 GNAT EGGS.
POSSIBLE GNAT KILLING =
3 MILLION X 14 = 42 MILLION
FROM 40 BAIT TRAPS IN 1 YEAR



Control Efforts cont.

- 1956 – 1993: Arrival of Dr. Mir Mulla.
Development of attractants mixed with toxic sugar bait to apply directly to soil to kill adult eye gnats

Development of traps to use where direct application of bait to soil not available (golf courses, certain agriculture areas)

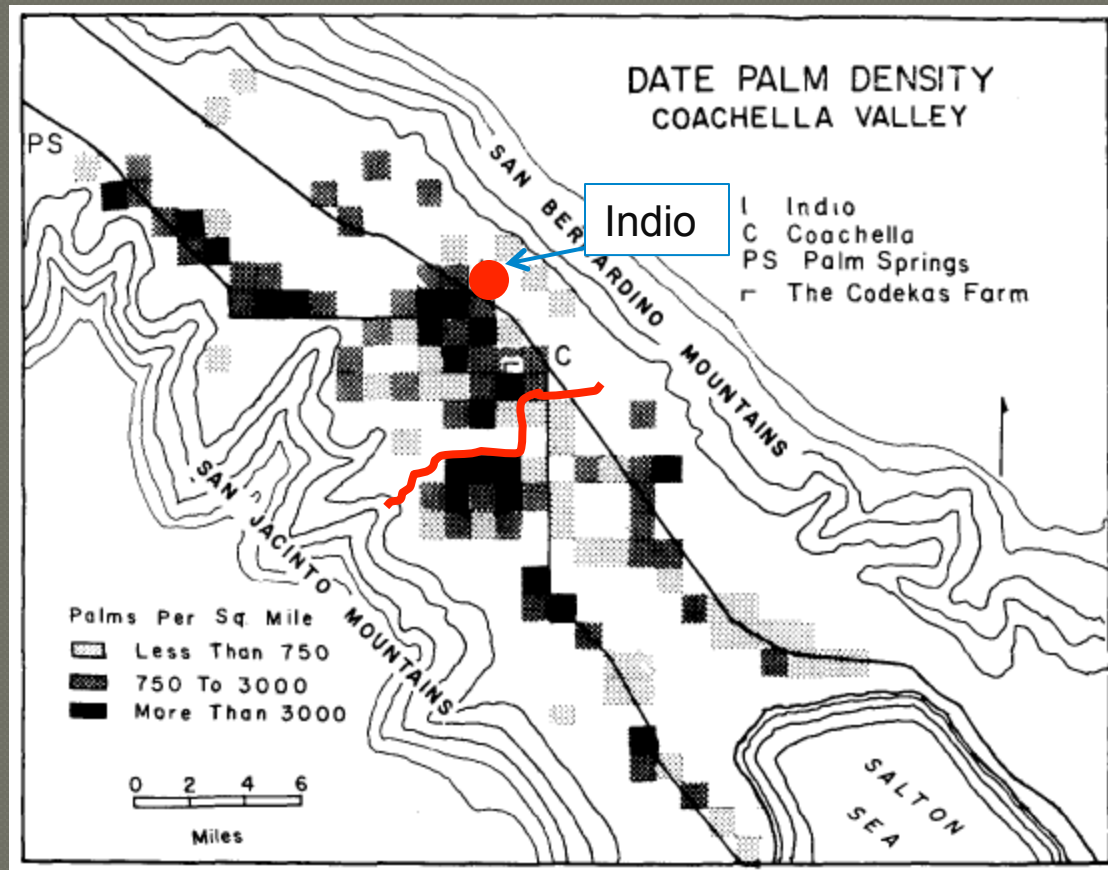
Collar Trap



Disposable Trap



Date Palm Distribution – 1960's



Current Date Palm and other Agricultural product distribution has changed

Current Program – Rural Areas

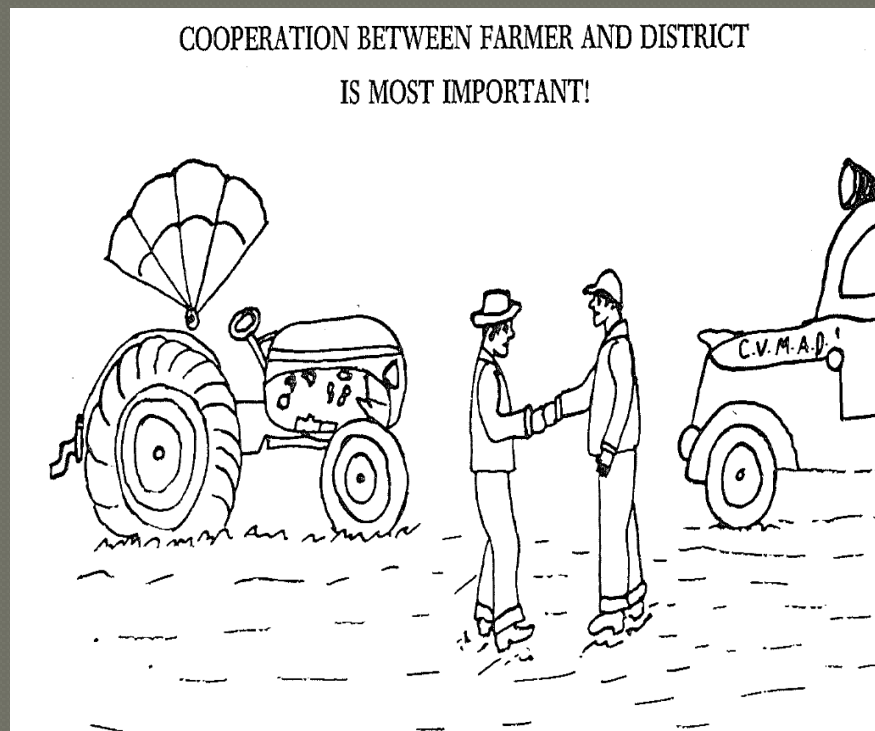
- Disposable traps placed about every 40 ft in problem areas
- Traps mounted 4 ft above ground
- Newly baited bottles attract eye gnats (1st week) old bait attracts flies (2nd week)
- Bait refreshed on 14 day cycle

Current Program – Golf Courses

- Three collar traps placed along each fairway
- Traps secured to trees
- Egg bait solution used – maintained on weekly basis

Agricultural Practices

- ◉ Less tilling the soil
- ◉ Change from flooding to drip irrigation



Present

- ◉ Eye gnat problem is greatly reduced
- ◉ No more school closings
- ◉ More separation of agriculture and residential areas
- ◉ Outdoor recreation very popular (over 125 golf courses in Coachella valley)

THANK
YOU

