PECAN WEEVIL

Biology, Distribution and Management Options

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AgriLIFE EXTENSION
Texas A&M System

Pecan Weevil

- Biology
- Damage
- Distribution
- Quarantine/Movement
- Management
- Resources

Pecan Weevil

- Indigenous to North America
- A nut feeder of all species of *Carya* (hickory)
- 1 specimen from *Carya palmeri* (Mexican hickory) from Mexico (Nuevo Leon)
- 1 record from *Juglans regia* (Persian walnut/ English walnut) in Ontario, Canada

BIOLOGY

“know your enemy”

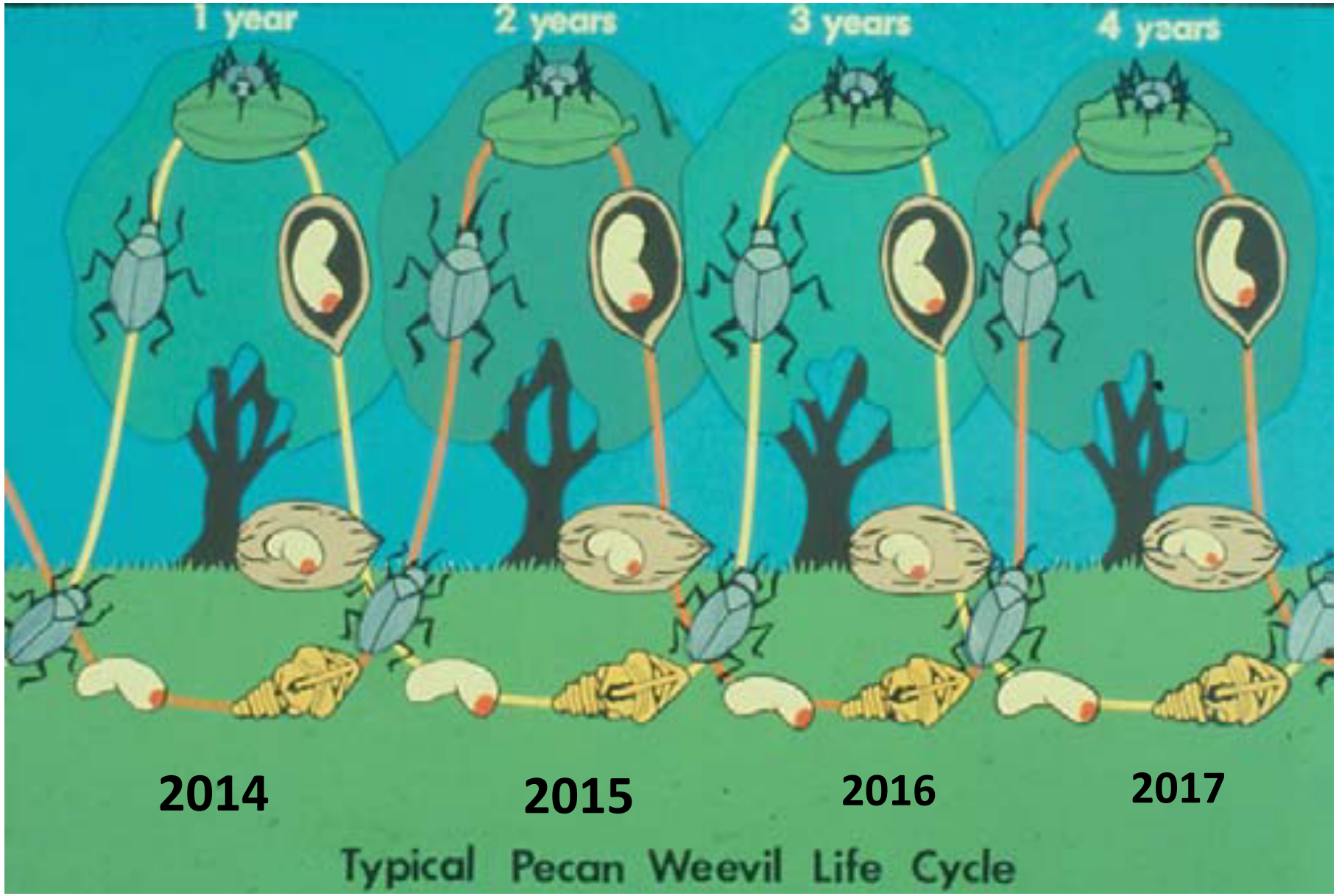
PECAN WEEVIL ADULT

PECAN WEEVIL ADULTS

Male Female

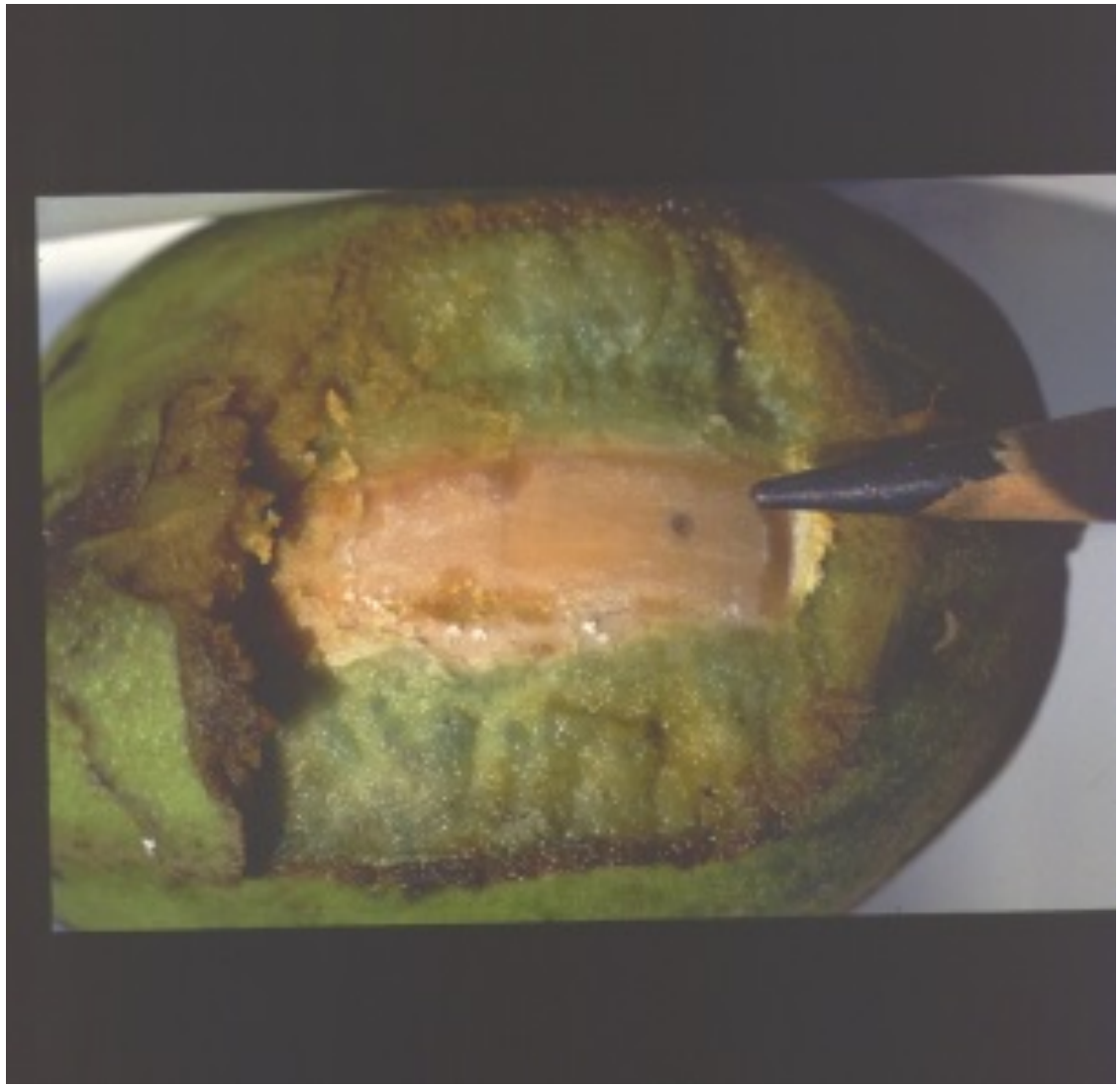
Pecan Weevil

- 2- 3 year life cycle in the soil
- ~90 percent on a 2 year cycle
- ~10 percent on a three year cycle


1 year
2 years
3 years
4 years
2014
2015
2016
2017
Typical Pecan Weevil Life Cycle

How do PW get to the canopy?

- Que in on tree as a dark vertical silhouette
- 77 percent climb to top of stick, grass, etc and fly to trunk at a height of about 6 – 8 feet
- About 15 percent fly directly into canopy
- About 5 percent walk over to tree trunk



Female Pecan Weevil Ovipositing in Pecan

60 to 75 eggs in her life @ 3 to 4 per day

Pecan Weevil Eggs
3 – 4 eggs per nut

Larvae feed for 36 days

Pecan weevil grub exiting nut

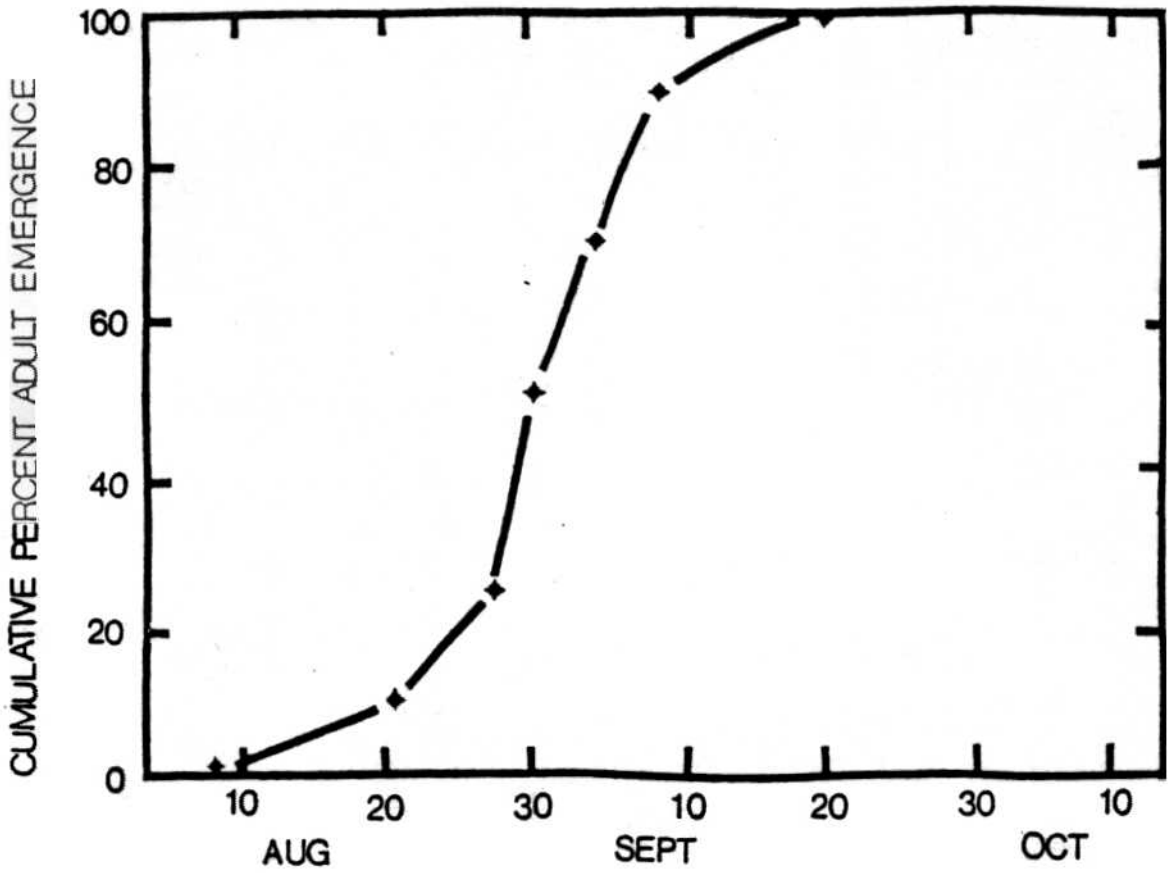
~ 42 Days

Pecan Weevil Exit Hole

Bird Damage

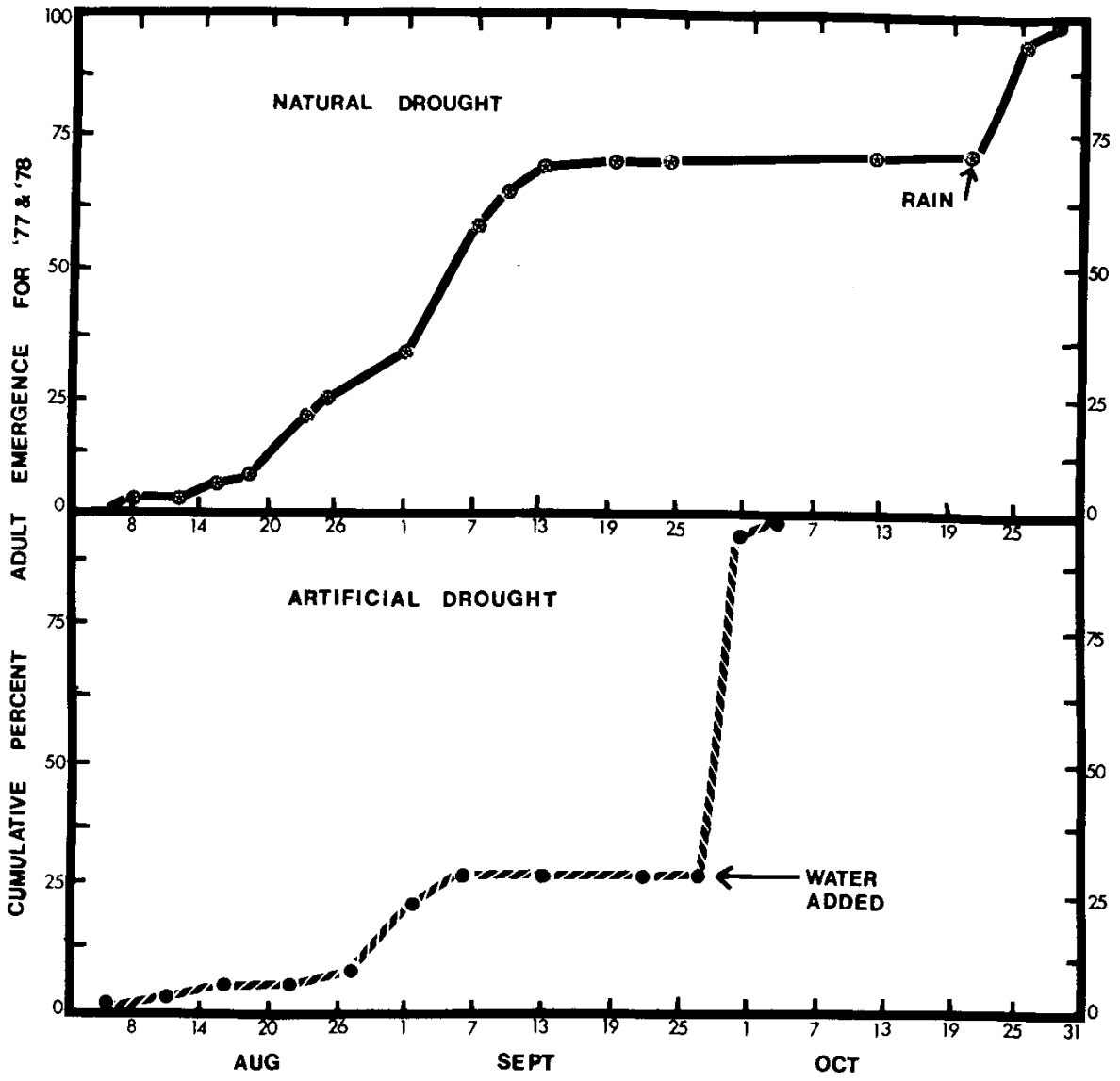
Pecan Weevil Pupae in Earthen Cell

“Normal” Emergence curve of adult pecan weevils



80 % emergence between Aug 20 and Sept 10

Emergence curves of adult pecan weevil showing drought delay patterns



Checking for Potential Drought Delayed Emergence

- Aggie Soil Penetrometer
- 8 inch ½ inch dowel in block of wood
- 132 lbs to push in soil – no drought delay

DAMAGE

Pecan Weevil Damage

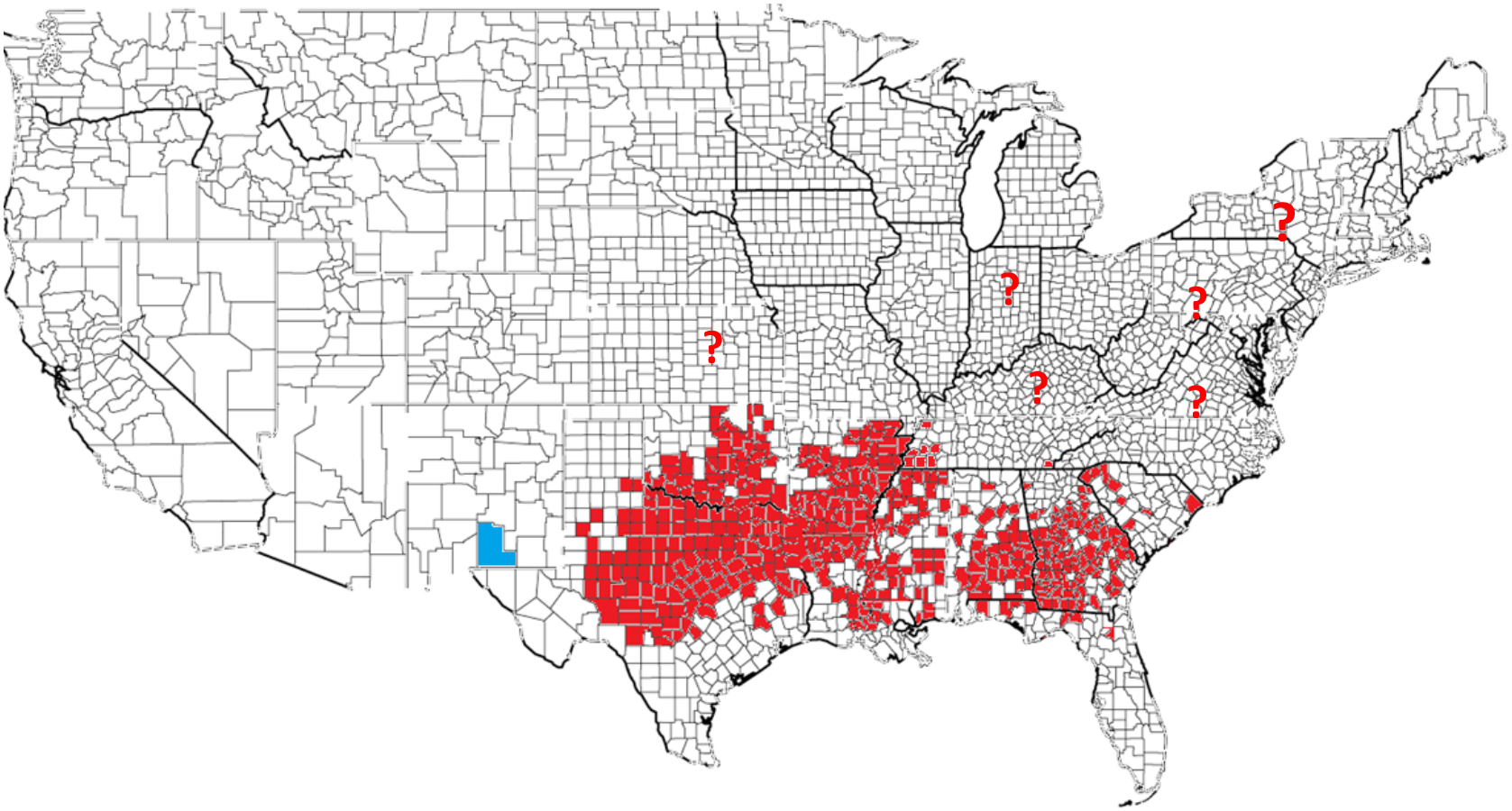
- Must have consistent production to have a weevil problem
- Most damage from harvestable nut loss
- Some damage (nut drop) from feeding in water stage


(979) 775-0373
1009 West Wm. J. Bryan -- Bryan, Texas

Problems associated with Pecan Weevil

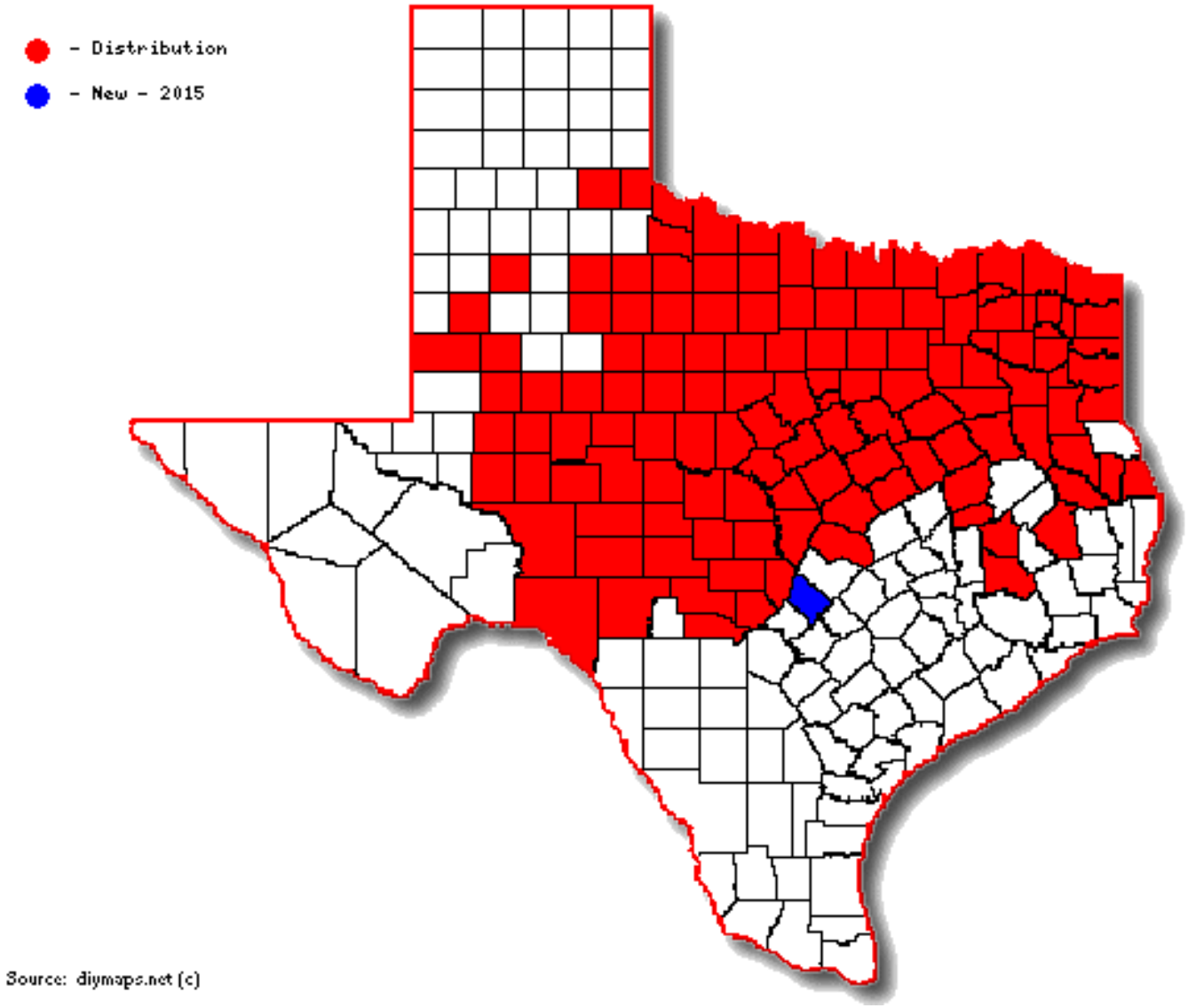
- Direct Economic loss – wholesale
- Direct Economic loss – retail
- Added production costs
- Added quarantine treatment costs

DISTRIBUTION
And
MOVEMENT



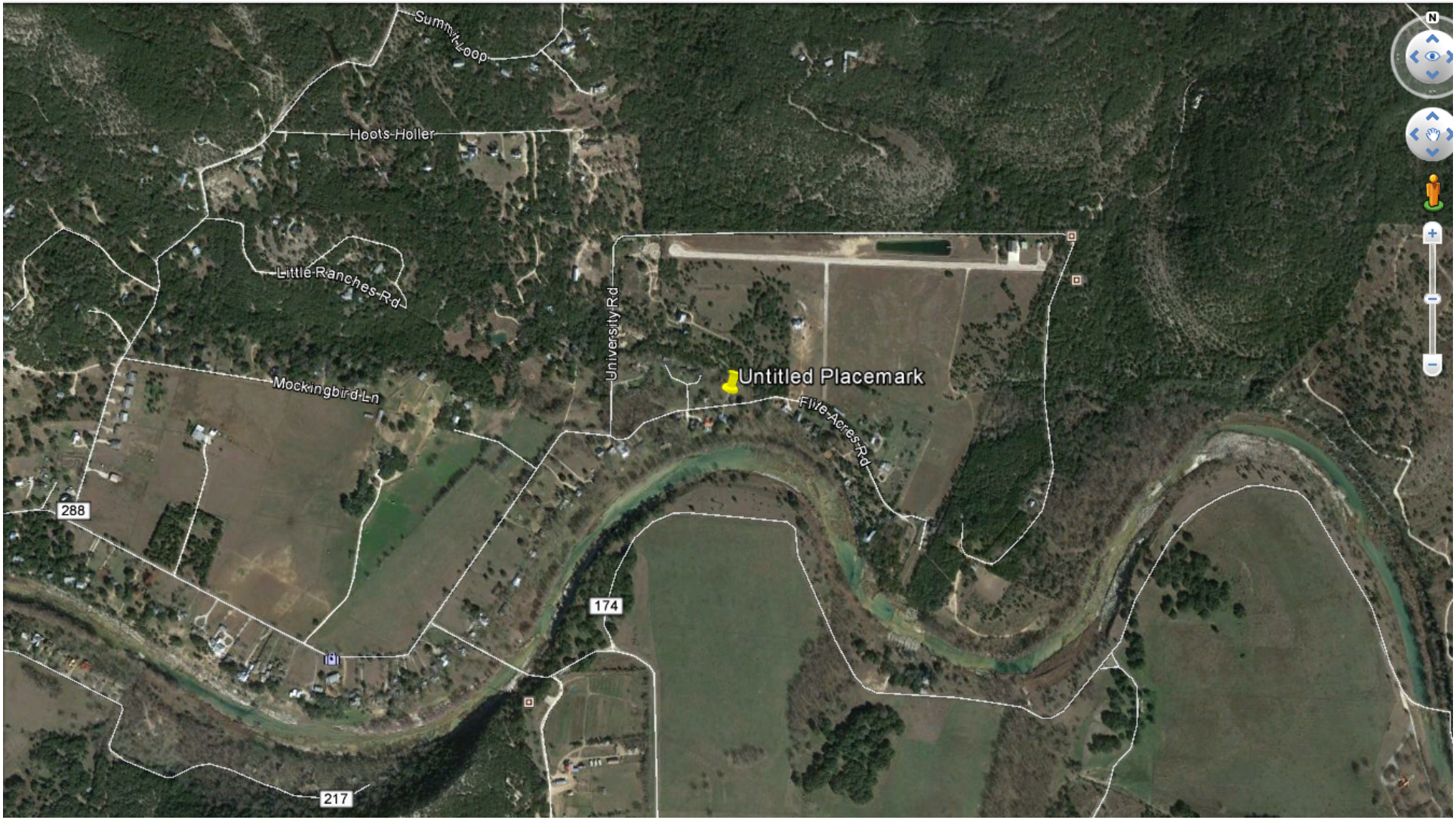
Pecan weevil distribution on pecan
1979 data
Texas data - 2015

Pecan weevil distribution on pecan.

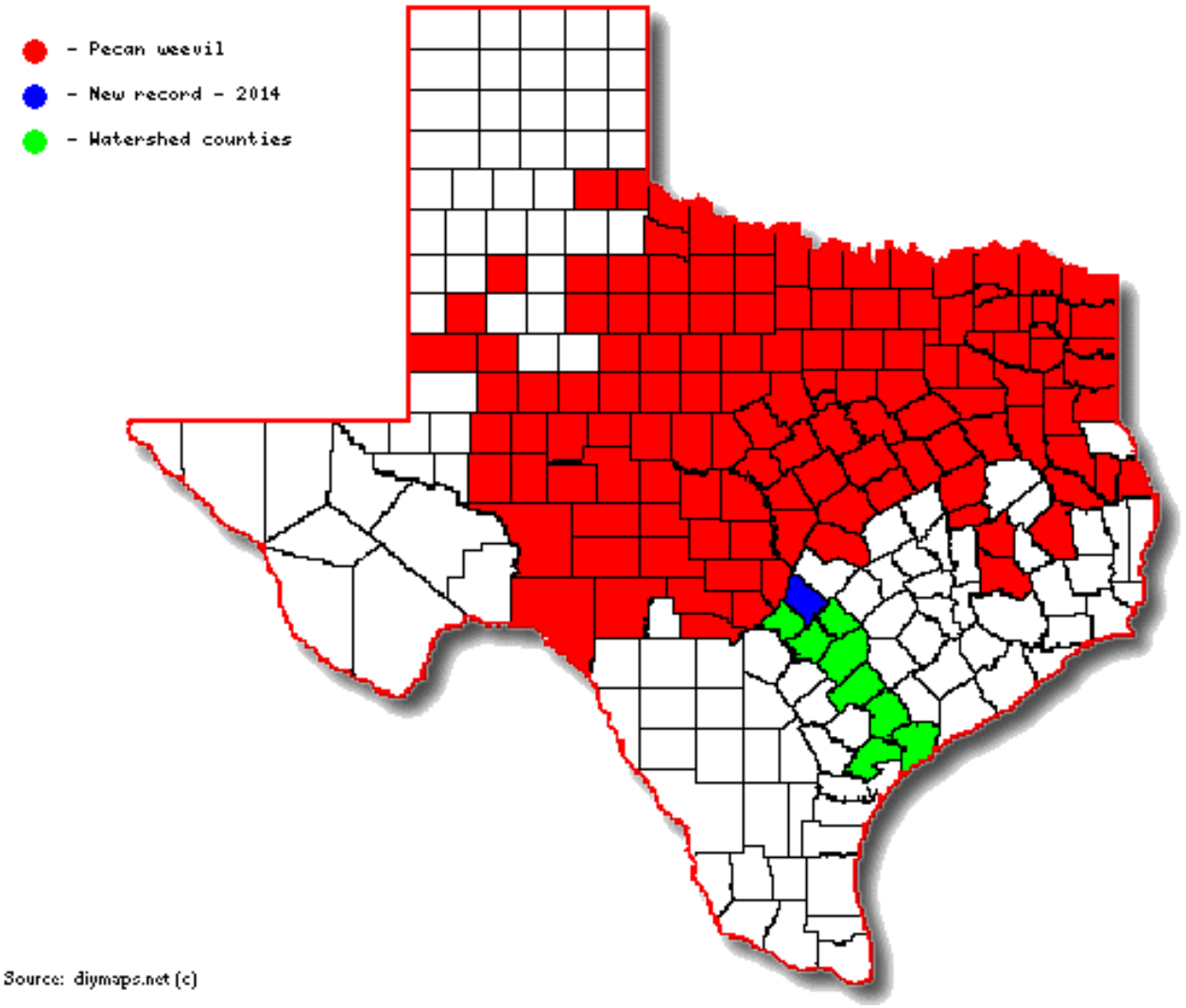


Source: diymaps.net (c)

NEW REPORT – DECEMBER 2014

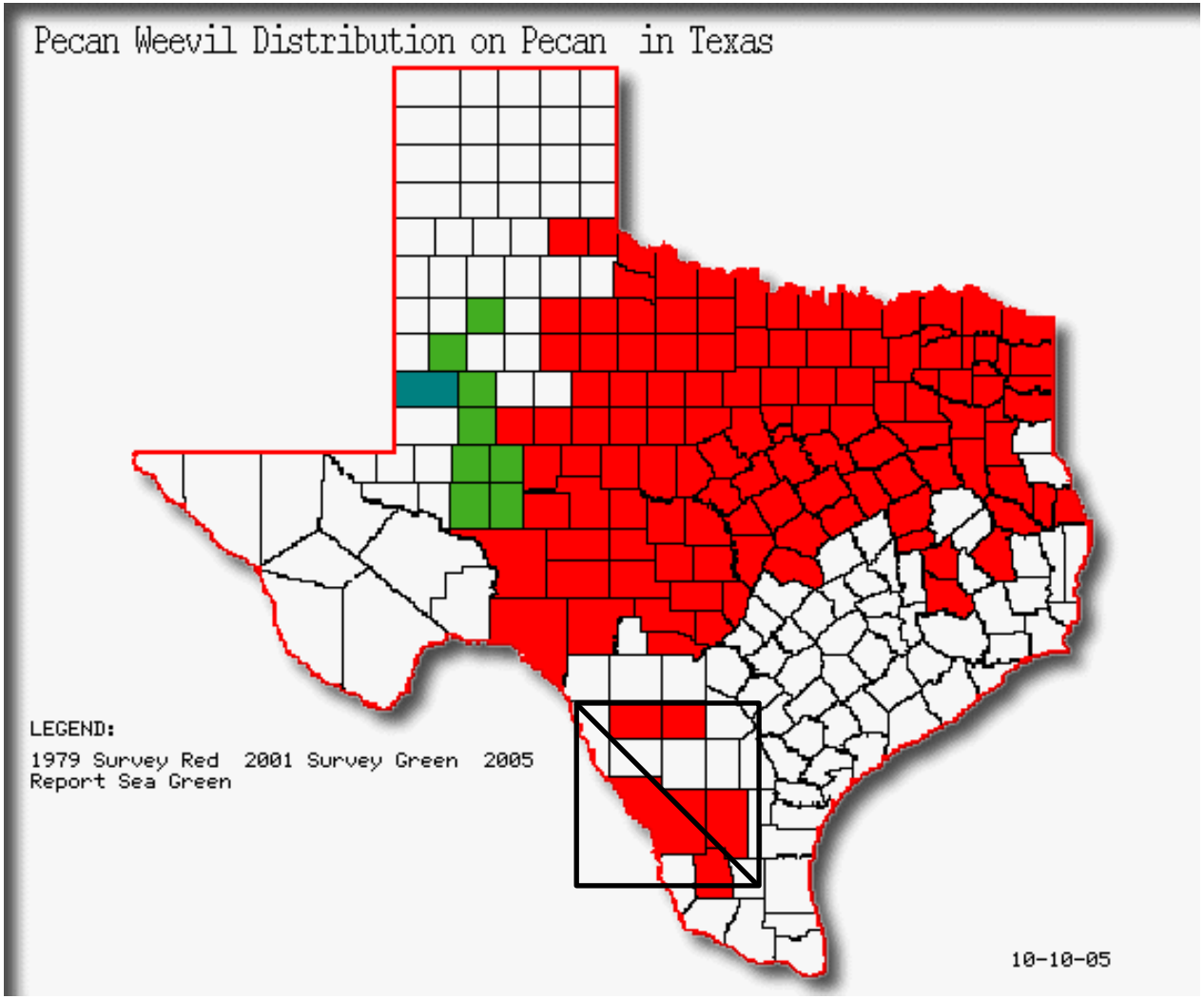


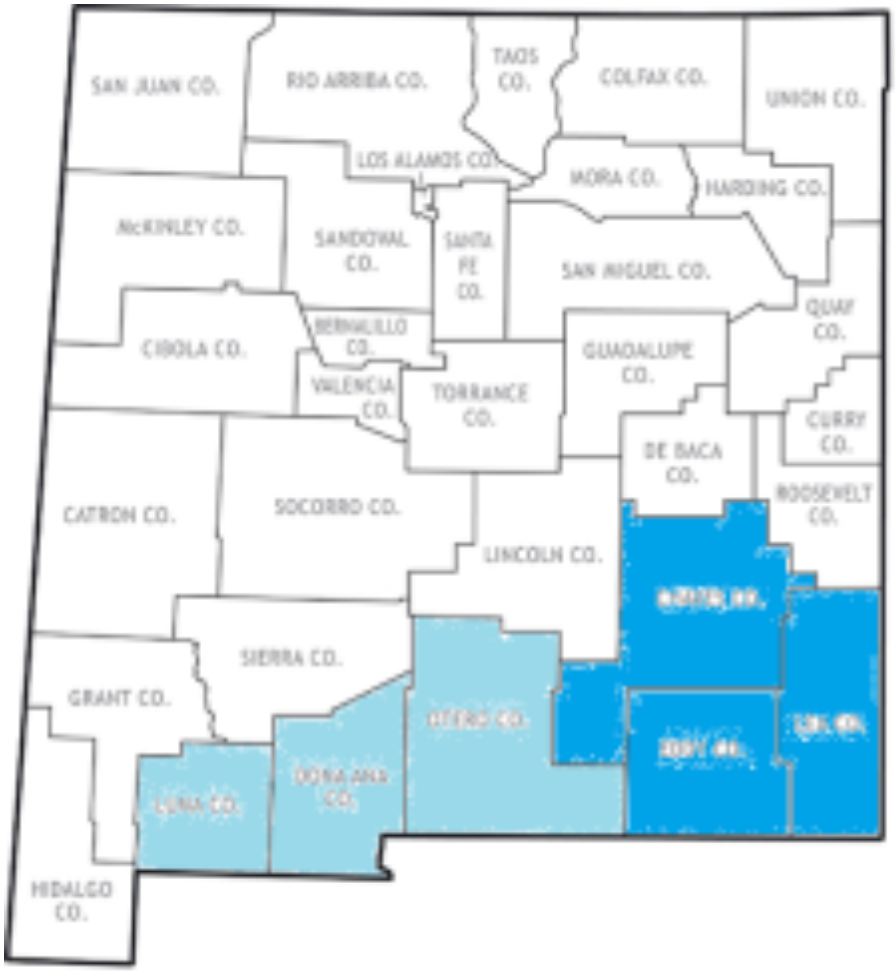
Pecan Weevil Distribution on Pecan and Watershed Area



Source: diymaps.net (c)

Old Pecan Weevil Distribution map



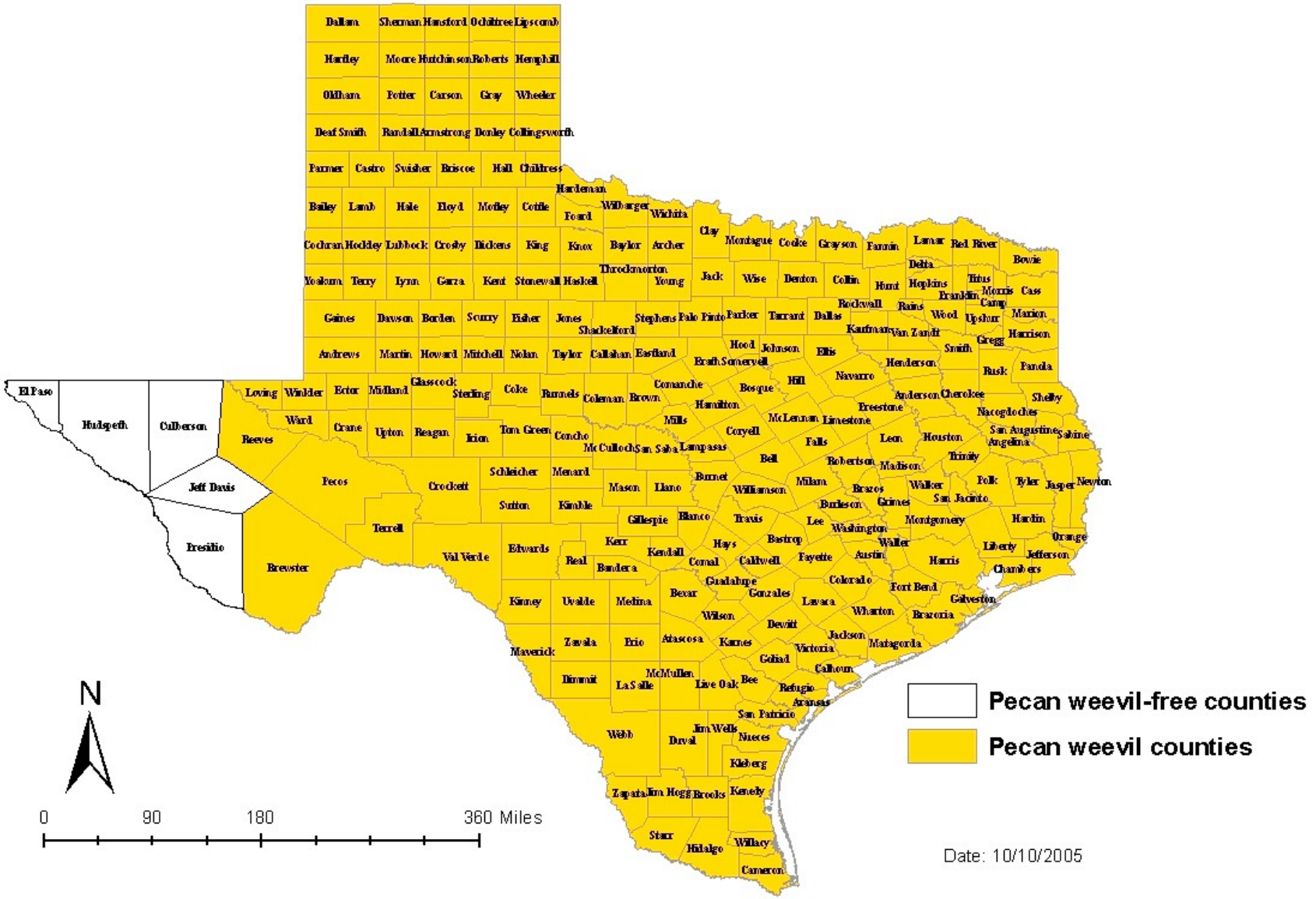

SAN JUAN CO.
RIO ARRIBA CO.
TAOS CO.
COLFAX CO.
UNION CO.
LOS ALAMOS CO.
MORA CO.
HARDING CO.
McKINLEY CO.
SANDOVAL CO.
SANTA FE CO.
SAN MIGUEL CO.
QUAY CO.
BERNALILLO CO.
CIBOLA CO.
VALENCIA CO.
TORRANCE CO.
GUADALUPE CO.
CURRY CO.
DE BACA CO.
ROOSEVELT CO.
CATRON CO.
SOCORRO CO.
LINCOLN CO.
SIERRA CO.
GRANT CO.
OTERO CO.
LUNA CO.
DONA ANA CO.
HIDALGO CO.
Under eradication
Eradicated

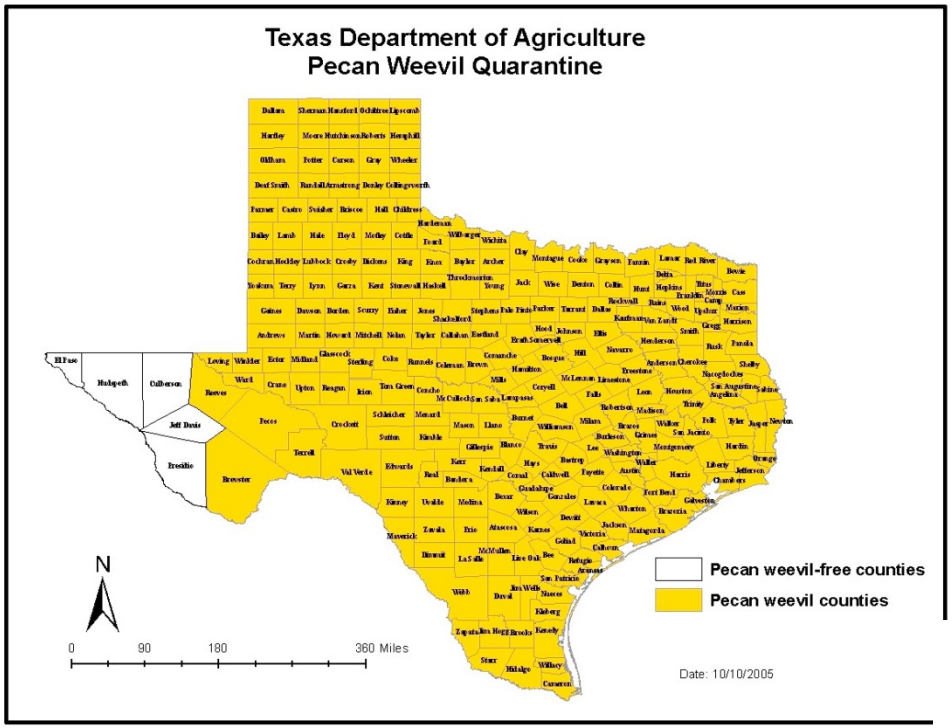
How can PW disperse?

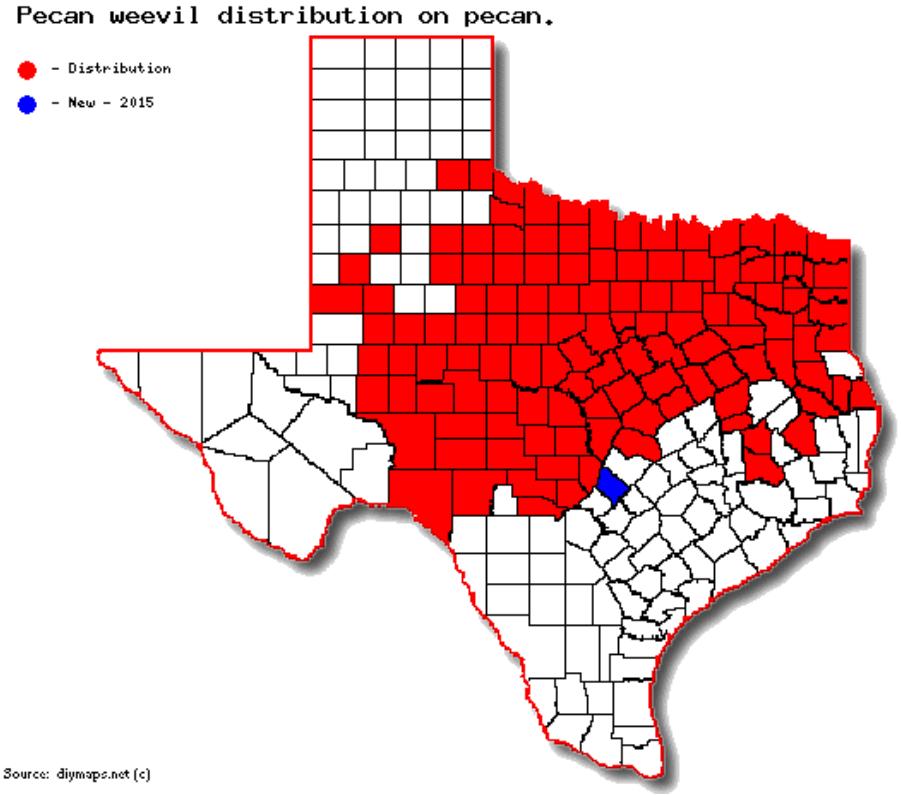
- Females will move (Fly) from canopy to canopy to seek suitable pecans for oviposition.
- Infested nuts moved in equipment
- Infested nuts moved through trade
- Average citizen picks up nuts on side of road, discards in a different location

QUARANTINES

Texas Department of Agriculture
Pecan Weevil Quarantine




Texas Department of Agriculture
Pecan Weevil Quarantine
N
0
90
180
360 Miles
Pecan weevil-free counties
Pecan weevil counties
Date: 10/10/2005


Pecan weevil distribution on pecan.
- Distribution
- New - 2015
Source: diymaps.net (c)

Texas Administrative Code

TITLE 4	AGRICULTURE
PART 1	TEXAS DEPARTMENT OF AGRICULTURE
CHAPTER 19	QUARANTINES AND NOXIOUS AND INVASIVE PLANTS
SUBCHAPTER L	PECAN WEEVIL QUARANTINE

Rules

§19.120	Quarantined Pest
§19.121	Quarantined Areas
§19.122	Quarantined Articles
§19.123	Restrictions

New Mexico Administrative Code

TITLE 21 AGRICULTURE AND RANCHING
CHAPTER 17 PEST, DISEASE, AND WEED CONTROL
PART 28 PECAN WEEVIL EXTERIOR QUARANTINE

21.17.28.1 ISSUING AGENCY: New Mexico State University, New Mexico Department of Agriculture
MSC 3189, Box 30005, Las Cruces New Mexico 88003-8005, Telephone No. (575) 646-3007.
[7/1/97; 21.17.28.1 NMAC - Rn & A, 21 NMAC 17.28.1, 05/29/09]

21.17.28.2 SCOPE: Part 28 shall apply to all persons transporting regulated articles into or through New Mexico.
[7/1/97; 21.17.28.2 NMAC - Rn, 21 NMAC 17.28.2, 05/29/09]

21.17.28.3 STATUTORY AUTHORITY: Granted to the board of regents of New Mexico state university under the Pest Control Act, Chapter 76, Article 6, Sectic
[7/1/97; 21.17.28.3 NMAC - Rn, 21 NMAC 17.28.3, 05/29/09]

21.17.28.4 DURATION: Permanent.
[7/1/97; 21.17.28.4 NMAC - Rn, 21 NMAC 17.28.4, 05/29/09]

21.17.28.5 EFFECTIVE DATE: July 1, 1997
[7/1/97; 21.17.28.5 NMAC - Rn, 21 NMAC 17.28.5, 05/29/09]

21.17.28.6 OBJECTIVE: The objective of Part 28 of Chapter 17 is to establish an exterior quarantine in order to prevent the introduction of the pecan weevil into
[7/1/97; 21.17.28.6 NMAC - Rn, 21 NMAC 17.28.6, 05/29/09]

21.17.28.7 DEFINITIONS: [RESERVED]

21.17.28.8 PECAN WEEVIL EXTERIOR QUARANTINE: In order to prevent the introduction of the pecan weevil into New Mexico, the board of regents here
except under restrictions herein described.

A. Pests: pecan weevil, *Curculio caryae* (horn).
B. Areas under quarantine: All states and districts of the United States except Arizona, California, E1 Paso and Hudspeth counties, Texas and that part of C
C. Regulated articles:
(1) Nuts of all species and varieties of pecan and hickory, and sacks used in harvesting, hulling, dehydrating, shelling, transporting or storing of any nuts or h
(2) Boxes, containers, equipment, appliances, machinery and vehicles used in connection with harvesting, hulling, dehydrating, shelling, transporting or stor
(3) Whole, live trees or parts thereof with soil attached.
(4) Hulls, husks, shells and fragments of hulls, husks and shells of all species and varieties of pecan and hickory.

[7/1/97; 21.17.28.8 NMAC - Rn, 21 NMAC 17.28.8, 05/29/09; A, 10/30/09]

MANAGEMENT
or
ERADICATION ?


2903 Flite Acres Rd
Exit Street View
© 2014 NEGI
© 2014 Google
© 2015 Google
Report a problem
Google earth
29°59'18.44" N 98°02'53.43" W elev 815 ft eye alt 807 ft

Management Options

- Do Nothing

- Pesticide Applications
  - Broad Spectrum products
  - Biologicals - Entomophagous fungi

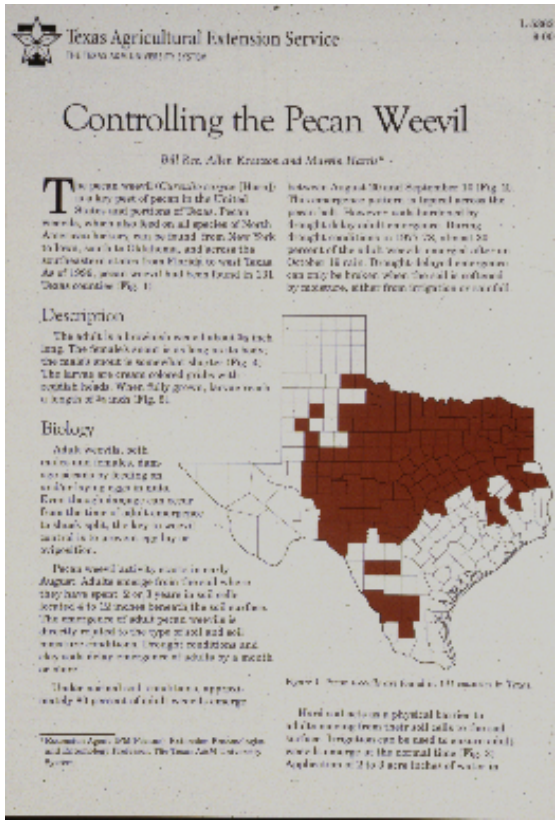
    Nematodes

- Exclusion

  Traps

  Barriers

PECAN WEEVIL



Texas Agricultural Extension Service

Controlling the Pecan Weevil

Description

Biology

Adult Pecan Weevil Emergence Traps

Wire Cone Traps

Circle Trap

Tedders Trap

WIRE CONE TRAPS

- Old stand by
- Durable
- Expensive to make
- Bulky to store
- Can not use with grazing livestock

“Tedders” or Pyramid Trap

- Relatively cheap to make (3 from one sheet of plywood)
- Easy to set up and store
- Can not be used with livestock
- Whitewashing tree trunk improves trap capture

Circle Trap

- Relatively cheap
- Can be used with livestock
- Would need right tree structure
- Might need more than one per tree

PECAN WEEVIL INSECTICIDE APPLICATIONS

- 1st application around time of dough formation. Applied regardless of trap catches.
- 2nd application made 10 days after the first application "if" adults are collected in traps 5 days after the first treatment.
- If no adults are being collected after the first treatment then delay the 2nd application until adults are collected.
- Continue to run traps up to harvest.

Pecan Weevil Management

1. Monitor nut development

2. Use adult emergence traps

3. Use carbaryl (*Sevin 80S) or bifenthrin

4. Keep records !!!!

RECORD KEEPING

ANY ACTIVITY THAT COULD RELATE TO PW

- Yield
- Percent PW damage
- Treatment dates, products and rates
- Rain fall dates and amounts
- Irrigation dates
- Harvest dates
- Crop stage at time of treatment
- Problem areas or varieties
- Etc.

Eradication

- Multiple treatments that cover the entire susceptible stage of the pecans – prior to Gel to shuck split
-
- Will take 4 - 5 years of treatments, or longer ?

- Will have to rotate insecticides

If suspicious samples are found:

- **Collect nut sample**
- **Note location:**

Send to:

- **Your County Extension Agent or NMSU entomologist**

Or

- **Bill Ree**

  P.O. Box 2150

  Bryan, TX 77806-2150

Resources for producers

Texas Cooperative EXTENSION
The Texas A&M University System

E-343
3-05

Controlling the Pecan Weevil

*Bill Ree, Allen Knutson and Marvin Harris**

The pecan weevil (*Curculio caryae* [Horn]) is a key pest of pecan in the United States and portions of Texas. Pecan weevils, which also feed on all species of North American hickory, can be found from New York to Iowa, south to Oklahoma, and across the southeastern states from Florida to west Texas. As of 1999, pecan weevil had been found in 131 Texas counties (Fig. 1).

Description

The adult is a brownish weevil about 3/8 inch long. The female's snout is as long as its body; the male's snout is somewhat shorter (Fig. 4). The larvae are cream colored grubs with reddish heads. When fully grown, larvae reach a length of 3/5 inch (Fig. 5).

Biology

Adult weevils, both males and females, damage pecans by feeding on and/or laying eggs in nuts. Even though damage can occur from the time of adult emergence to shuck split, the key to weevil control is to prevent egg lay or oviposition.

Pecan weevil activity starts in early August. Adults emerge from the soil where they have spent 2 or 3 years in soil cells located 4 to 12 inches beneath the soil surface. The emergence of adult pecan weevils is directly related to the type of soil and soil moisture conditions. Drought conditions and clay soils delay emergence of adults by a month or more.

Under normal soil conditions, approximately 80 percent of adult weevils emerge between August 20 and September 10 (Fig. 2). This emergence pattern is typical across the pecan belt. However, soils hardened by drought delay adult emergence. During drought conditions in 1977-78, almost 30 percent of the adult weevils emerged after an October 19 rain. Drought-delayed emergence can only be broken when the soil is softened by moisture, either from irrigation or rainfall.

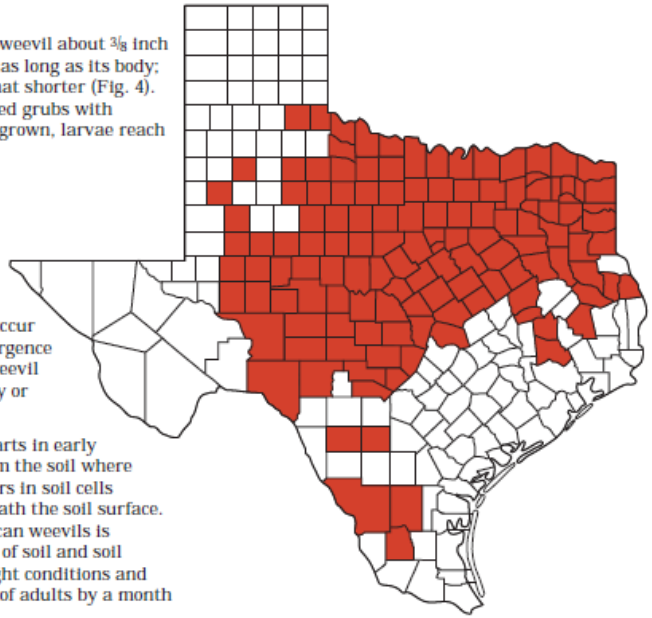


Figure 1. Pecan weevils are found in 131 counties in Texas.

Hard soil acts as a physical barrier to adults moving from their soil cells to the soil surface. Irrigation can be used to ensure adult weevils emerge at the normal time (Fig. 2). Application of 2 to 3 acre inches of water in

*Extension Agent-IPM(Pecans), Extension Entomologist and Entomology Professor, The Texas A&M University System.

ACKNOWLEDGEMENT

Mr. Brad Lewis – NMSU/NMDA for comments and suggestions for presentation and his efforts to eradicate PW in NM

QUESTIONS