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Photo by Hilda D. Gómez

**National Plan for the Detection of
HLB in Mexico,**

ACP Pilot Program in Baja California & Sonora,

&

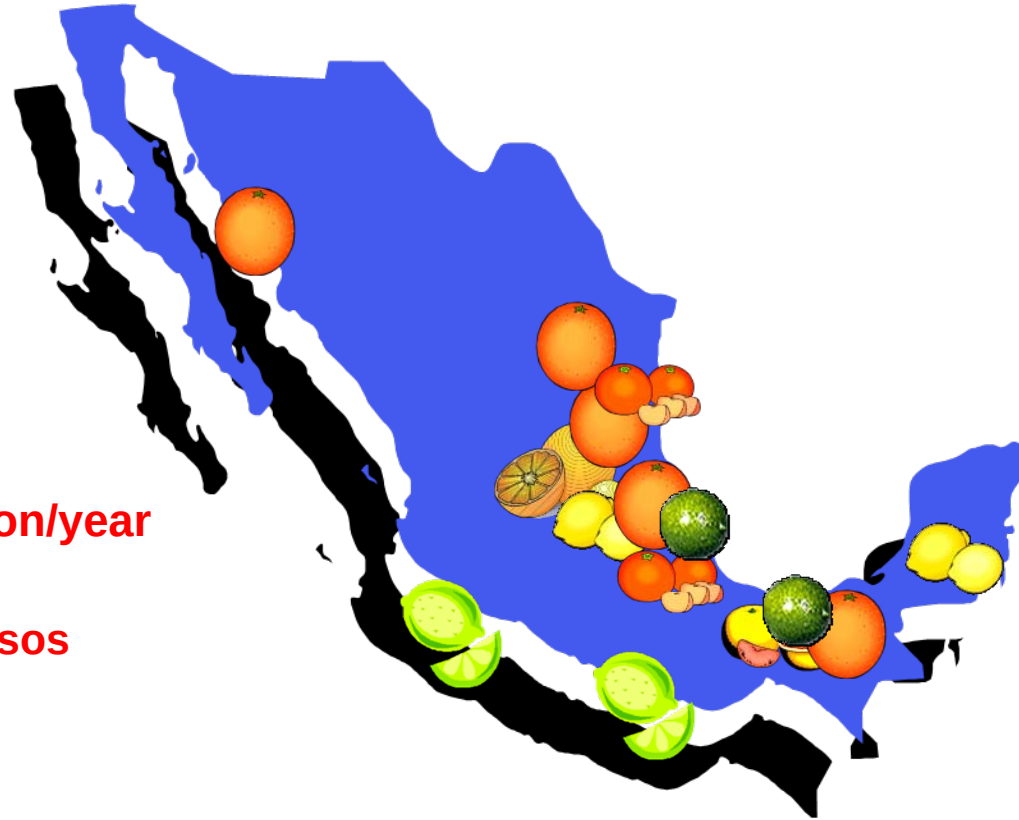
**Activities in Quintana Roo derived from
the detection of the psyllid in Belize.**

Junio 2009



Senasica

- o Surface: 526,000 ha
- o 23 States
- o Citrus production: 6.7 millions ton/year
- o Production value: 8'050 million pesos



Map: Courtesy of Victor Onchi

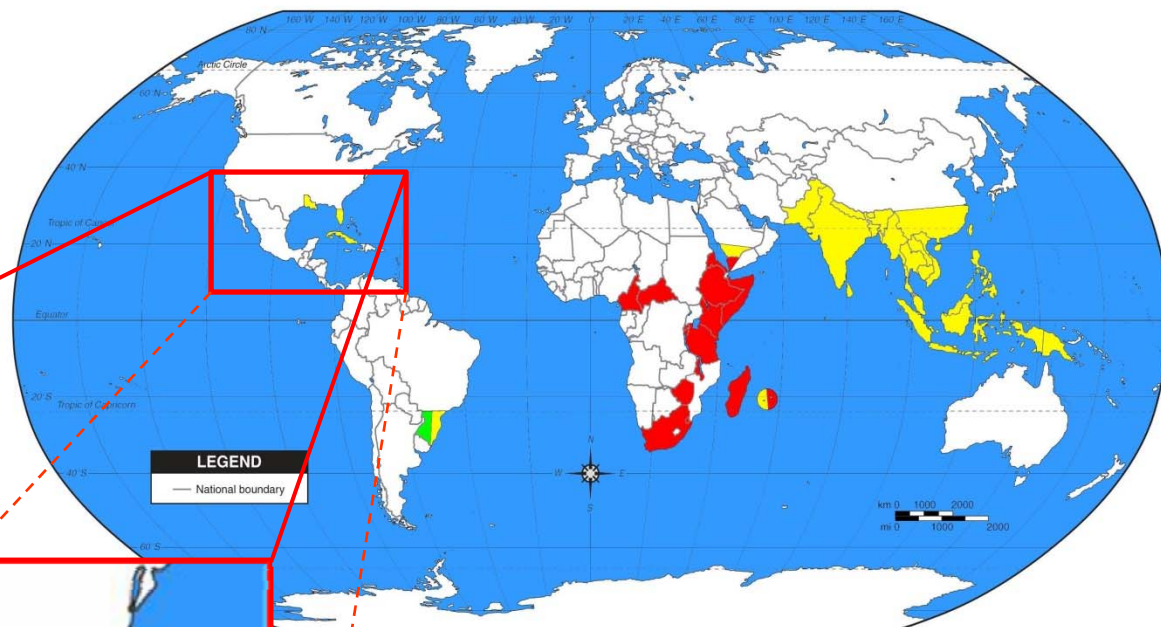
68.5% orange

20.5% mexican lime

5.2% persian lime

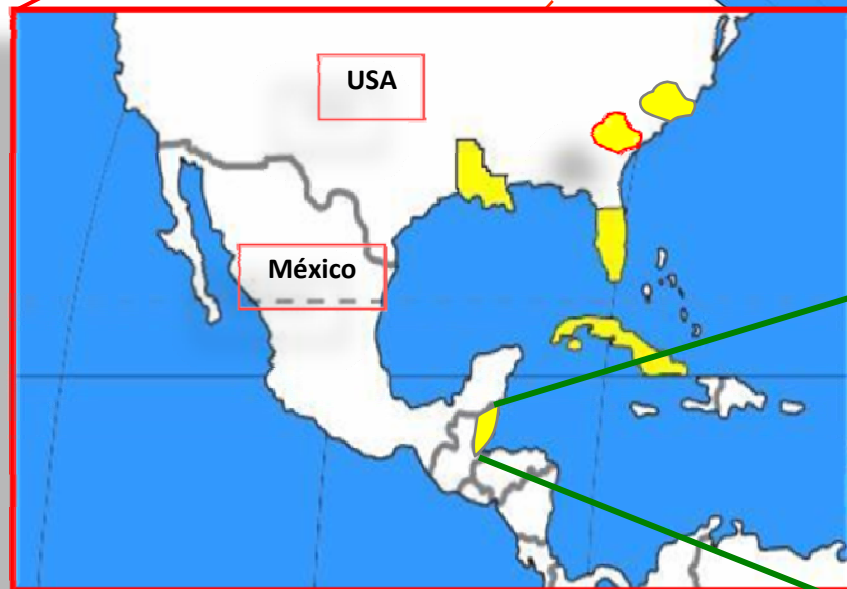


HLB Has Not Been Detected in Mexico



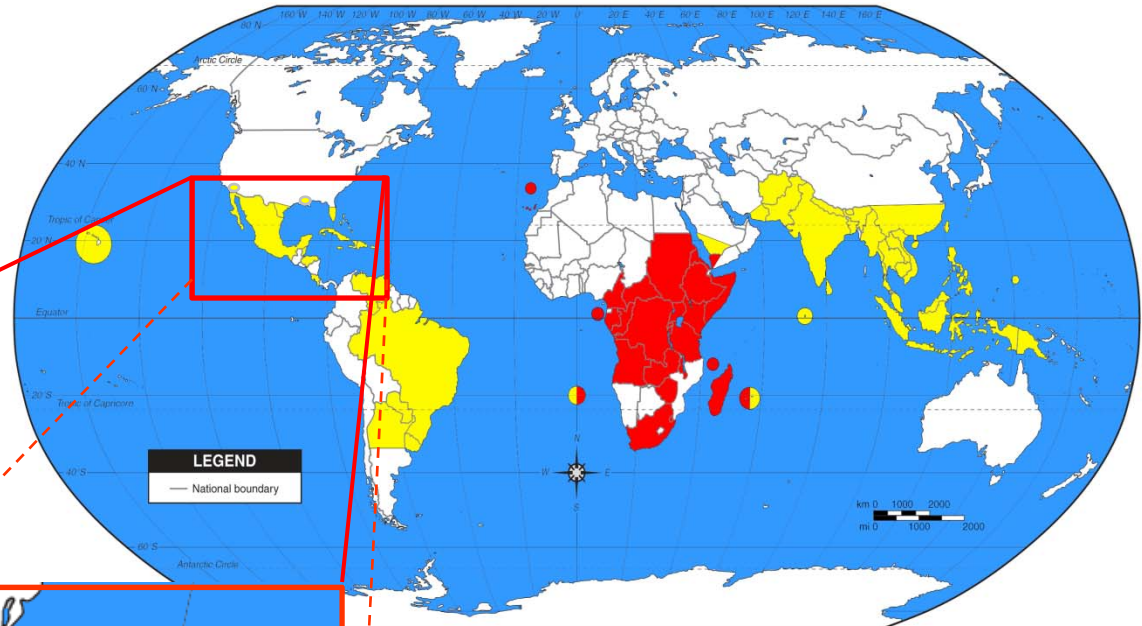
Map: Courtesy of John da Graca (modified)

- L. asiaticus
- L. africanus
- L. americanus



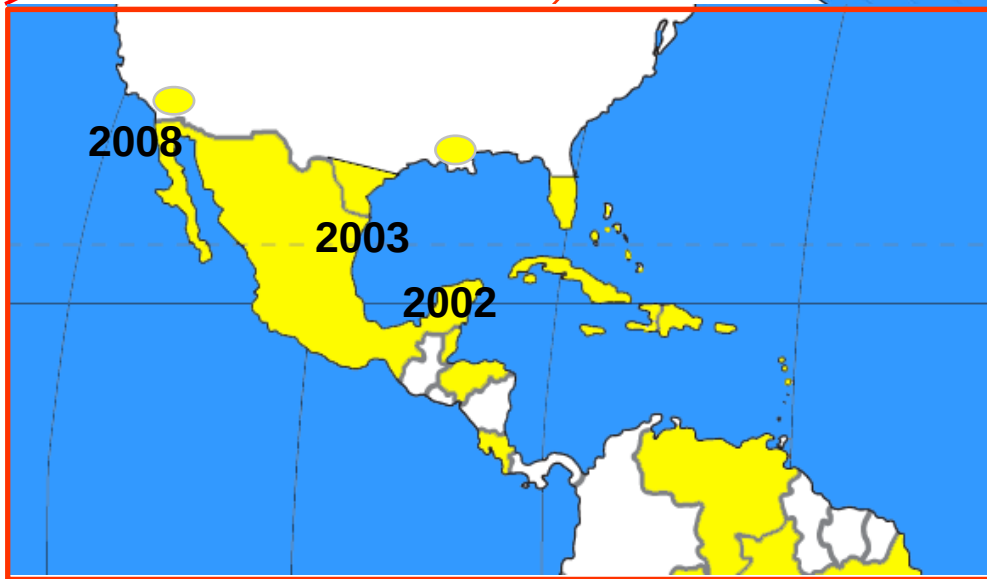
○ Corozal & Orange Walk





Map: Courtesy of John da Graca (modified)

 *Diaphorina citri*
 *Trioza erytreae*



- ACP was First Detected in Mexico - 2002
- ACP found in All 23 Citrus Producing States





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Photo by Hilda D. Gómez

National Plan for the Detection of HLB in Mexico

Junio 2009



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To early detect the presence of the disease in Mexico to be able to timely implement control activities.



The national survey is carried out annually.



❑ Vector sampling for diagnosis.



--- Technical Manual for the Detection of the Citrus Huanglongbing –
(www.senasica.sagarpa.gob.mx)

 High risk zones

{ 1 psyllid sample every 50 hectares.

 Medium risk zones

{ 1 psyllid sample every 100 hectares.

 Low risk zones

{ 1 psyllid sample every 300 hectares.



1 psyllid sample = 10-100 adult psyllids



□ Detection surveys,



Pedro Robles, SENASICA

HLB National Survey Began - January 2008

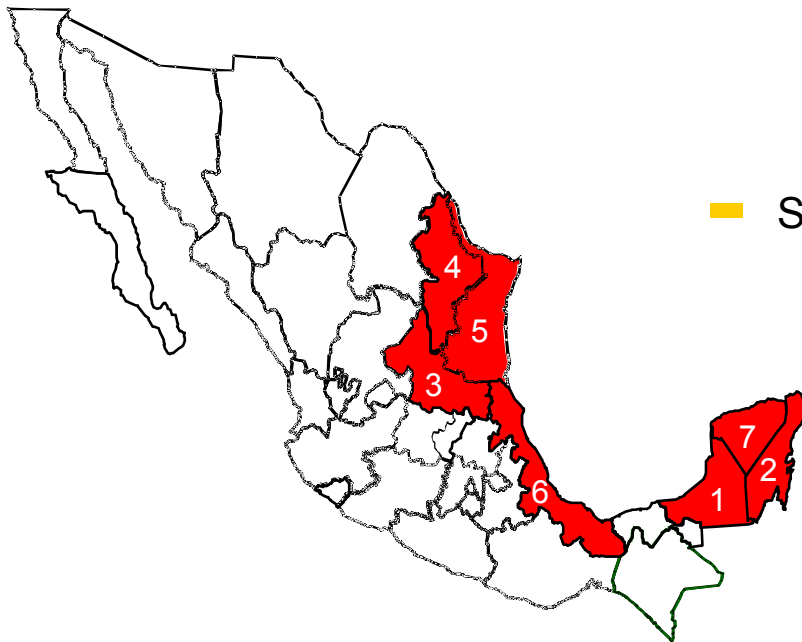
- Goal 2008 - Survey 10% the First Year or 50,000 Hectares
- Goal 2009 – Survey 14.5% or 76,332 Hectares



Orchards localized in High Risk Zones

150 orchards (≤ 50 ha)

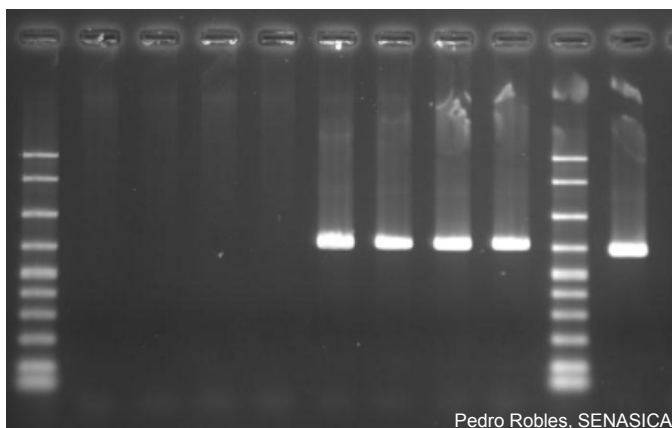
1. Campeche	(20)
2. Quintana Roo	(20)
3. San Luis Potosí	(10)
4. Nuevo León	(10)
5. Tamaulipas	(20)
6. Veracruz	(50)
7. Yucatán	(20)



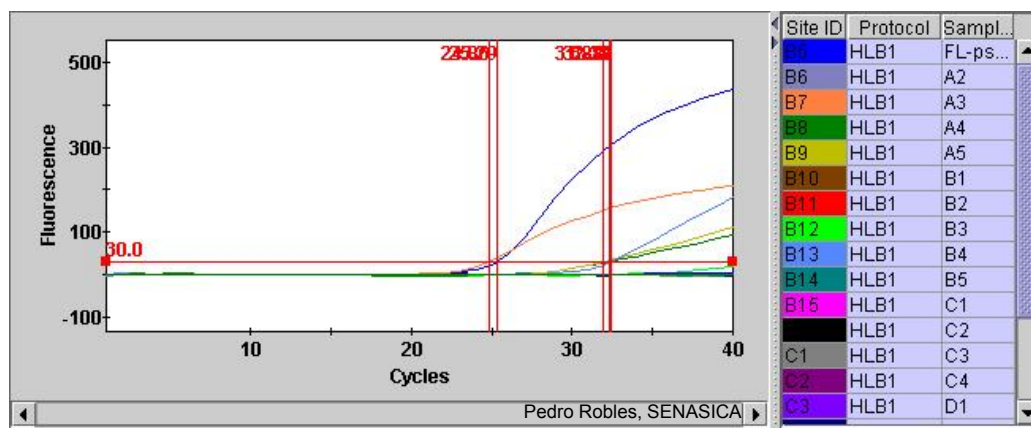
Sweet orange between 4 to 10 years old

- Check 100% of trees every 2 months
- Psyllid sample collection every 3 months.

- Official lab.
- Samples of plant material and psyllids.



Conventional PCR



Real Time - PCR





Region	Federal Resources	State Resources	Total Resources	Region	Federal Resources	State Resources	Total
Baja California	476,889	94,911	571,800	Oaxaca	1,200,000	300,000	1,500,000
B.C.S.	668,650	0.0	668,650	Puebla	1,254,500	0.0	1,254,500
Campeche	890,045	0.0	890,045	Querétaro	400,000	0.0	400,000
Colima	720,000	480,000	1,200,000	Quintana Roo	900,000	0.0	900,000
Chiapas	324,773	235,227	560,000	San Luis Potosí	1,049,338	501,746	1,551,084
Guerrero	767,700	511,800	1,279,500	Sinaloa	619,450	0.0	619,450
Hidalgo	1,429,500	275,547	1,705,047	Sonora	1,531,989	0.0	1,531,989
Jalisco	484,734	323,156	807,890	Tabasco	2,000,000	0.0	2,000,000
Michoacán	900,000	500,000	1,400,000	Tamaulipas	3,085,053	0.0	3,085,053
Morelos	571,800	381,200	953,000	Veracruz	6,715,825	1,000,000	7,715,825
Nayarit	667,100	0.0	667,100	Yucatán	2,700,068	977,485	3,677,553
Nuevo León	1,110,000	490,000	1,600,000	Total	30,467,414	6,071,072	36,538,486

▪ 2008 = \$36.5 million pesos (±\$3 million USD)



Region	Federal Resources	State Resources	Total Resources	Region	Federal Resources	State Resources	Total
Baja California	1,429,500	0	1,429,500	Oaxaca	2,859,000	0	2,859,000
B.C.S.	1,000,000	0	1,000,000	Puebla	3,200,000	0	3,200,000
Campeche	1,170,000	630,000	1,800,000	Querétaro	750,000	0	750,000
Colima	1,048,300	0	1,048,300	Quintana Roo	1,150,000	25,391	1,175,391
Chiapas	619,450	333,550	953,000	San Luis Potosí	1,835,158	1,456,942	3,292,100
Guerrero	1,023,750	551,250	1,575,000	Sinaloa	1,031,770	0	1,031,770
Hidalgo	3,335,500	0	3,335,500	Sonora	1,321,202	0	1,321,202
Jalisco	2,080,000	1,120,000	3,200,000	Tabasco	1,436,850	773,688	2,210,538
Michoacán	990,600	533,400	1,524,000	Tamaulipas	3,768,284	0	3,768,284
Morelos	1,000,000	500,000	1,500,000	Veracruz	5,774,290	861,950	6,636,240
Nayarit	1,000,000	0	1,000,000	Yucatán	2,700,068	977,485	3,677,553
Nuevo León	1,062,500	687,500	1,750,000	Total	41,586,222	8,451,156	50,037,378

▪ 2009 = \$50.1 million pesos (±\$3.8 million USD)



2008	May 2009
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10,670 9,381 Groves:

11,033 8,840 Growers

50,157 34,543 Hectares:

5 635,917 5 145,264 Trees Inspected

299 1,597 Lab Tests Carried out for HLB (ACP specimens) – All Negative Results

44 64 Lab Tests for HLB (Plant material) – All Negative Results

June 10, 2009

2008	May 2009
7,007	6,472 Orange
569	512 Mandarin
552	368 Grapefruit
2,482	2,011 Mexican and Persian Lime
60	18 Lime

2008	May 2009
35,809	23,951 Orange
2,811	1,682 Mandarin
3,837	1,910 Grapefruit
7,523	6,971 Mexican and Persian Lime
177	29 Lime

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- Technicians of the DGSV
- Diagnostic of HLB using PCR and RT-PCR
- Beltsville, Maryland and Querétaro, México
- August of 2007 and november of 2008





**Training on
HLB symptoms
recognition**

**Florida, USA
January 2008**



**International
Workshop of the
HLB and Asian
Citrus Psyllid**

**Hermosillo, Son
May 2008**



**National
Workshop
about GPS
management**

**Monterrey, N.L.
July 2008**



**National
Workshop of
the HLB,
Leprosis,
Canker and
CVC**

**Villahermosa,
Tab.
August 2008**





GOBIERNO
FEDERAL

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Huanglongbing de los cítricos (HLB)

(Greening o enverdecimiento de los cítricos)



Agente causal

Bacteria llamada *Candidatus Liberibacter* spp

Especies

Existen tres especies: *CaL asiaticus*; *CaL africanus* y *CaL americanus*

Distribución mundial de HLB



Vectores de la enfermedad

Esta bacteria es diseminada por los psílidos *Diaphorina citri* y *Triozia erytrae*.

Distribución mundial de los Vectores



En el caso de México, *Diaphorina citri* está presente en todos los Estados, excepto en Baja California.

Los vectores se alimentan de los brotes tiernos de los cítricos, entre otras especies, y de la planta ornamental conocida como limonaria (*Murraya paniculata*); considerada el hospedero preferido por el psílido.

La bacteria también se disemina mediante yemas y plantas de vivero contaminadas.

Importancia para México

Esta enfermedad representa una amenaza seria, debido a que puede afectar gravemente las 526 mil ha. establecidas con cítricos, distribuidas en 23 Entidades Federativas, lo que representa una producción de 6.7 millones de toneladas anuales, con un valor de \$8,050 millones de pesos (SIAP, 2006).

Distribución de los cítricos en México



Factores de riesgo por HLB

- ☐ Cercanía con Cuba y Florida, EEUU
- ☐ Presencia de *Diaphorina citri*
- ☐ Superficie establecida con naranja.

Síntomas del HLB



Aclaramiento de nervaduras



Moteados asimétricos en las hojas



Hojas con nervaduras engrosadas o corchiosas



Amarillamiento de las ramas, visible sólo en sectores del árbol



Frutos deformes y con sabor amargo



Semillas atrofiadas.

Control:

Después que las plantas son infectadas no hay medidas de control. Los árboles dejan de ser productivos poco a poco, hasta que mueren en un periodo máximo de 6 años, por lo que una vez que aparecen los síntomas deben ser eliminados inmediatamente para disminuir la diseminación de la enfermedad.

También es indispensable la producción de yemas y plantas de vivero producidas en instalaciones certificadas que cuenten con malla antiáfidos, para evitar llevar a campo plantas contaminadas.

Actividades de la campaña

Exploración para detección de síntomas, con el propósito de detectar y eliminar oportunamente las plantas infectadas por el HLB y evitar la presencia de brotes que contaminen el resto de las plantas.

Muestreo de psílidos para diagnóstico asintomático, para conocer si el vector está siendo portador de la bacteria, a pesar de que no se observen síntomas en campo.

Capacitación a técnicos, viveristas y productores, debido a que se requiere la participación decidida de todos los sectores.

Divulgación, para dar a conocer el riesgo que representa esta enfermedad y buscar la participación de todos los eslabones de la cadena citrícola.

Psílido asiático de los cítricos

Diaphorina citri



Adulto



Adultos



Ninfas



Ninfas



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Photo by Hilda D. Gómez

ACP Pilot Program in Baja California & Sonora

Junio 2009



Senasica

1st ACP detection in Baja California occurred in June 2008 in Tijuana

Mexico and U.S. have agreed to the establishment of a Pilot Program against the ACP, to suppress populations in the U.S. and Mexico, including; the northern areas of the Mexican States of Baja California (Municipalities of Tijuana, Tecate, Mexicali, Rosarito and Ensenada) and Sonora (Municipality of San Luis Rio Colorado) and the U.S. State of California (San Diego and Imperial Counties).





**WORK PLAN FOR THE
DETECTION, DELIMITATION,
TREATMENT AND
QUARANTINE FOR THE
ASIAN CITRUS PSYLLID (ACP)
IN THE NORTHERN AREAS OF
THE MEXICAN STATES OF
BAJA CALIFORNIA AND
SONORA
AND
MEXICO-US AGREEMENT TO
PREVENT AND PROTECT THE
BOTH COUNTRIES CITRUS
AREAS AGAINST THE
POTENTIAL DAMAGE POSED
BY THE PRESENCE OF THE
HUANGLONGBING (HLB) IN
FLORIDA, LOUISIANA AND
SOUTH CAROLINA IN THE US**

**PLAN DE TRABAJO PARA LA
DETECCIÓN, DELIMITACIÓN,
TRATAMIENTO Y CUARENTENA
DEL PSÍLIDO ASIÁTICO DE LOS
CÍTRICOS (PAC) EN LA REGIÓN
NORTE DE LOS ESTADOS DE
BAJA CALIFORNIA Y SONORA,
MÉXICO, Y COMPROMISOS DE
EEUU Y MÉXICO PARA
PROTEGER LAS ZONAS
CITRÍCOLAS DE AMBOS
PAÍSES DEL DAÑO POTENCIAL
POR LA PRESENCIA DE
HUANGLONGBING (HLB) EN
FLORIDA, LOUISIANA Y
CAROLINA DEL SUR, EEUU.**

2009

- **APHIS-DGSV Following CDFA “Model” Program for ACP Suppression/Control**
- **PROGRAM AREA: Baja California – Tijuana, Tecate, Rosarito, Ensenada & Mexicali**
Sonora – San Luis Rio Colorado
- **DETECTION:**
 - 25 sq/mile along US border - 5 sq/mile in other areas
- **CHEMICAL CONTROL:**
 - **COFEPRIS – Allowed Special Use Permit for Citrus in “Agricultural” Areas Using Mexican Insecticides on Jan. 15**
 - **SENASICA – Approved ACP Pilot Program on Jan. 16**
 - **Treatment Initiation – Tijuana on Feb. 4**
 - **COFEPRIS – Approved Importation of US Insecticides & “Urban Residential” use on Feb. 11**
- **BUDGET: Allocation \$750,000.00 USD**
- **PERSONEL and EQUIPMENT**
 - **CDFA Coordinator: 1**
 - **Permanent: 20 Inspectors**
 - **Temporary Field Personnel: 10; Laboratory Technician:1**

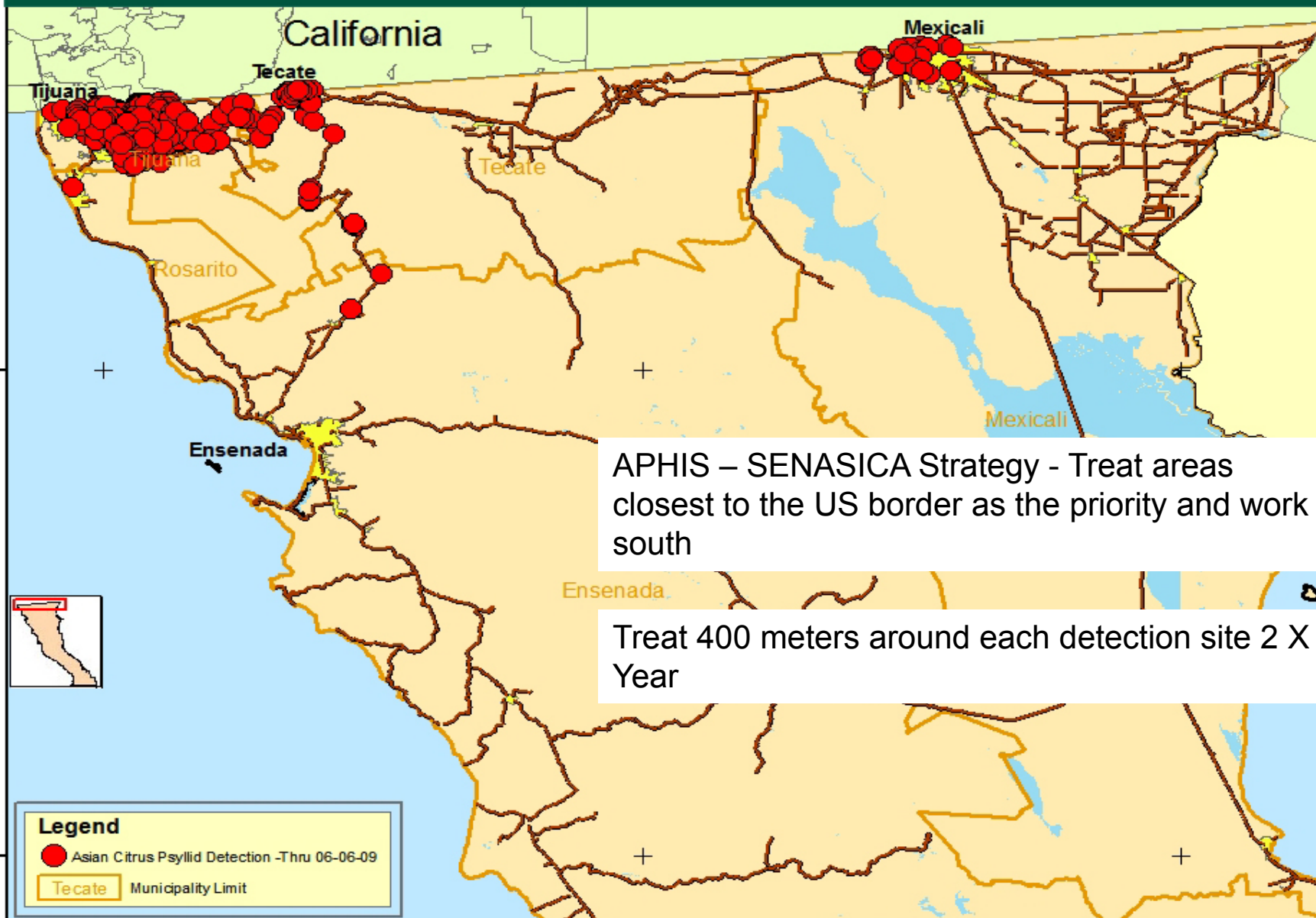
ACP DETECTION ACTIVITIES ACP FINDS BY MUNICIPALITY, YELLOW TRAPS INSTALLED AND TREATED GRIDS Thru Jun-06-2009

LOCATION	Total Area Sq. Mile(s)	ACP Infested Grids Sq. Mile(s)	ACP Detection Sites	Yellow Traps Installed	Treated Grids
TIJUANA	135	85	344	501	58
TECATE	43	26	49	133	26
ROSARITO	20	1	1	34	1
ENSENADA	48	3	5	68	0
MEXICALI	135	17	28	437	29
SAN LUIS RIO COLORADO	47	0	0	218	0





Asian Citrus Psyllid Cooperative Program Baja California, Mexico

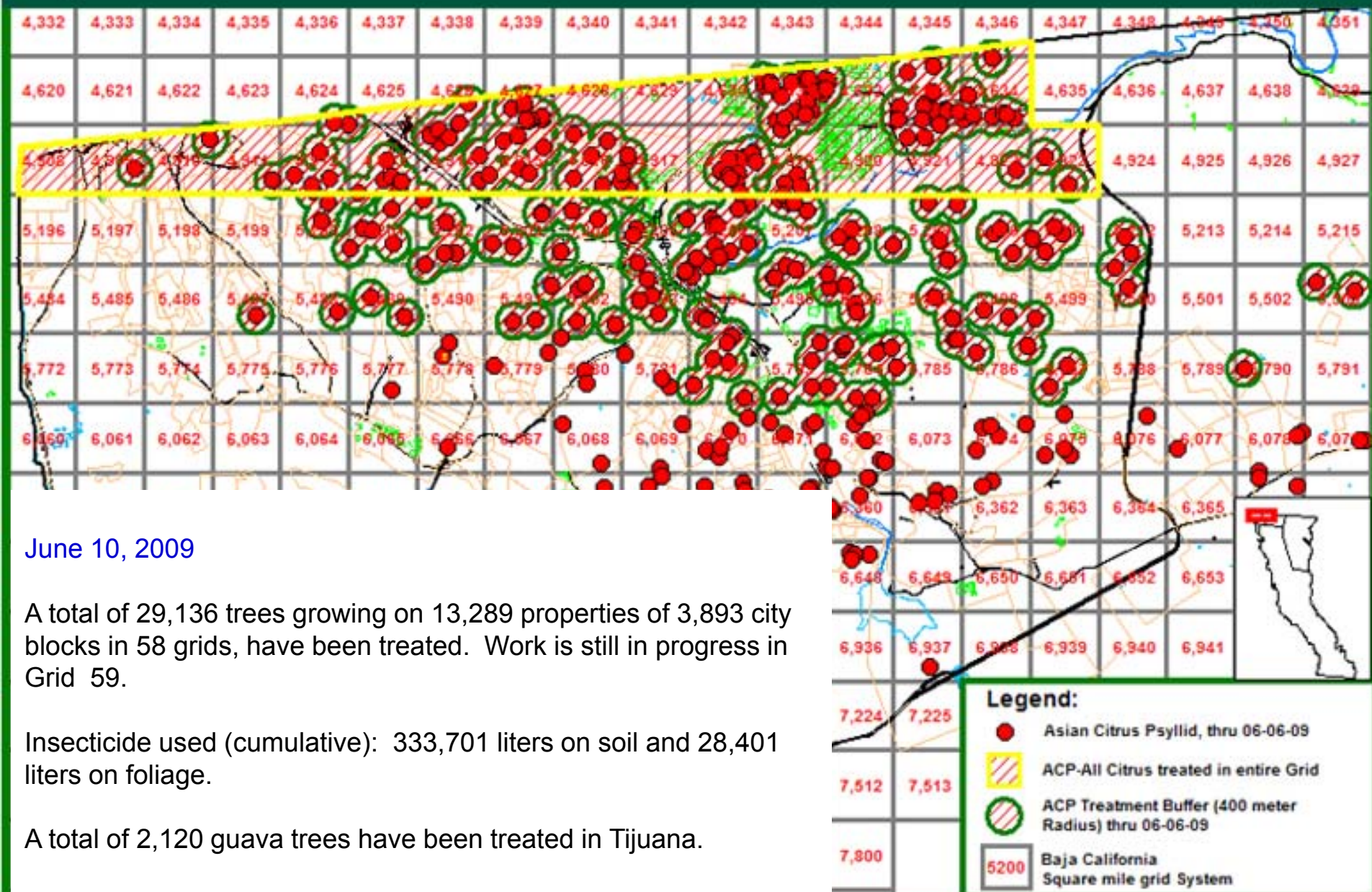


APHIS – SENASICA Strategy - Treat areas closest to the US border as the priority and work south

Treat 400 meters around each detection site 2 X Year



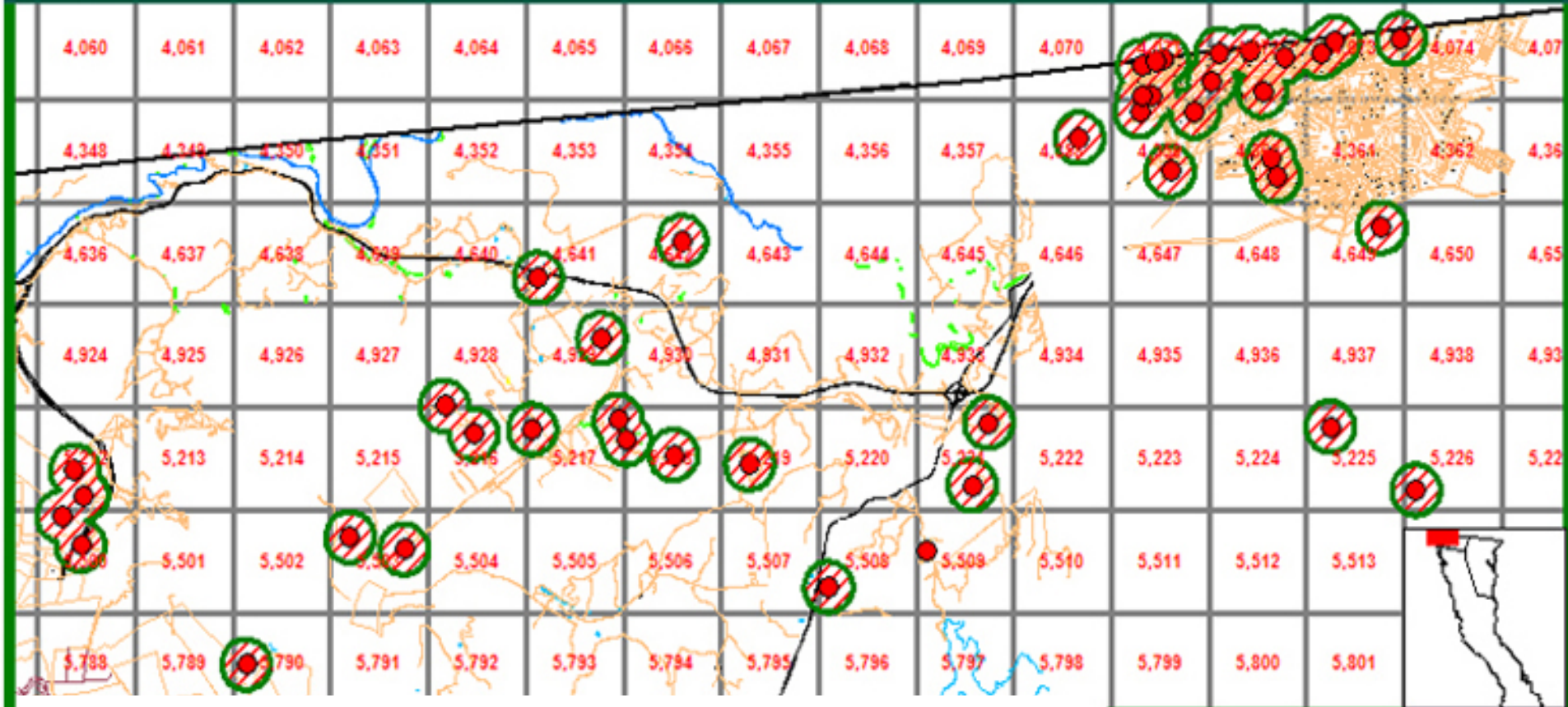
Asian Citrus Psyllid Cooperative Program Tijuana, Baja California







Asian Citrus Psyllid Cooperative Program Valle Redondo-Tecate, Baja California



June 2, 2009

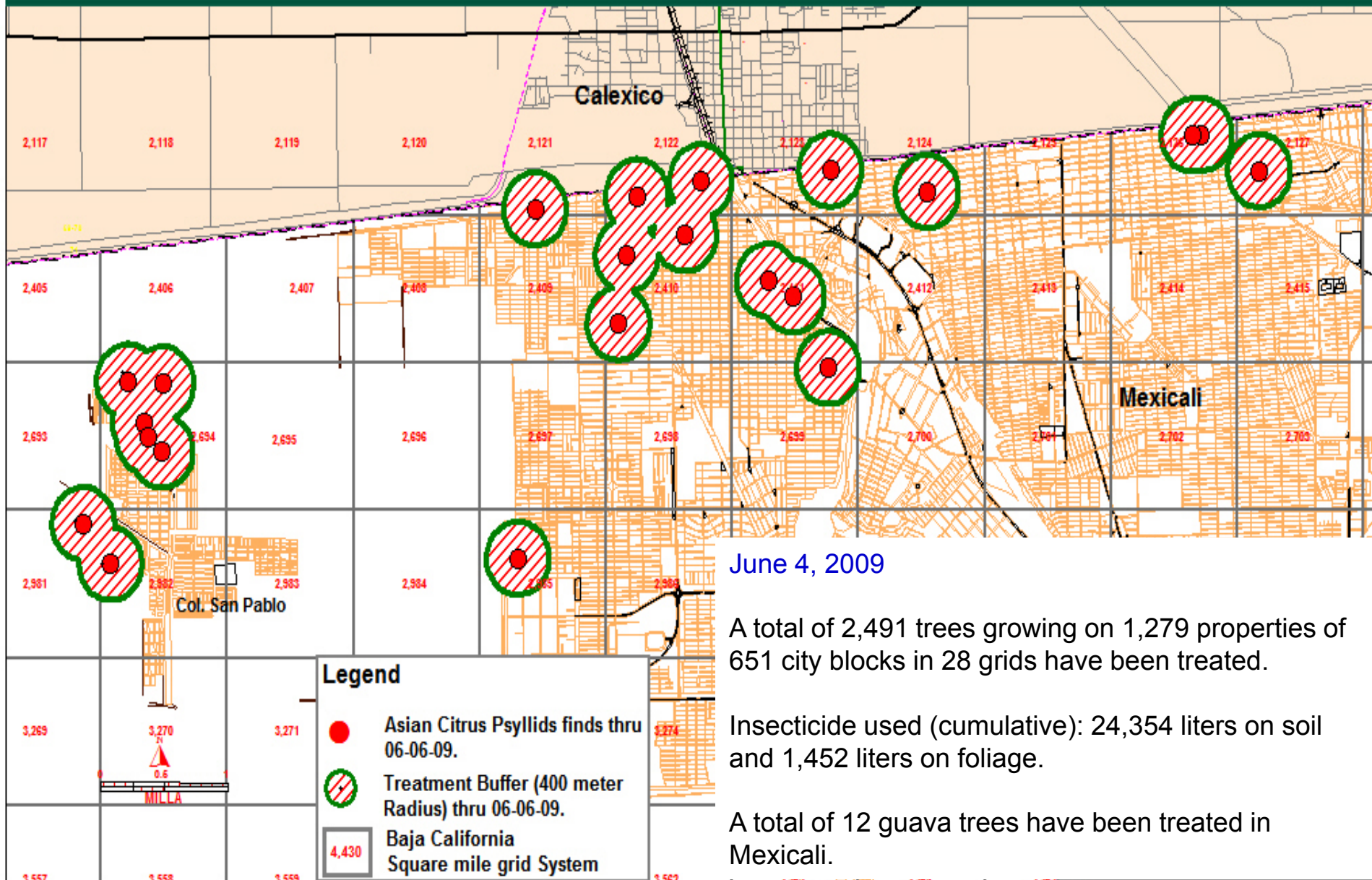
A total of 1,158 trees growing on 32 orchards of Tecate have been treated.

Insecticide used (cumulative): 12,768 liters on soil and 661 liters on foliage.

Legend:

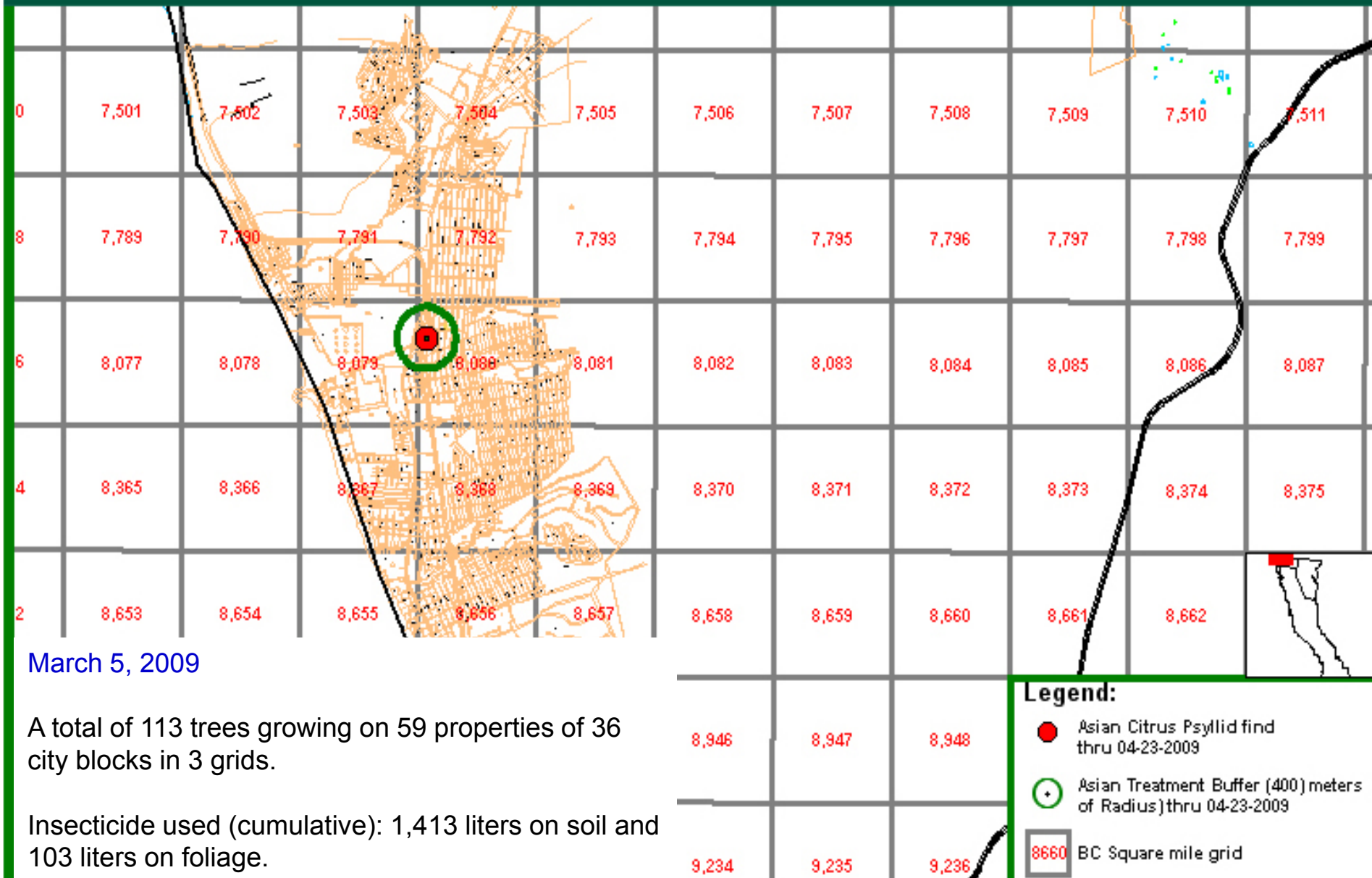
- Asian Citrus Psyllid, thru 06-06-09
- Treatment Buffer (400 meter Radius) thru 06-06-09.
- 5500 Baja California Square mile grid System.

Asian Citrus Psyllid Cooperative Project Mexicali, Baja California, Mexico



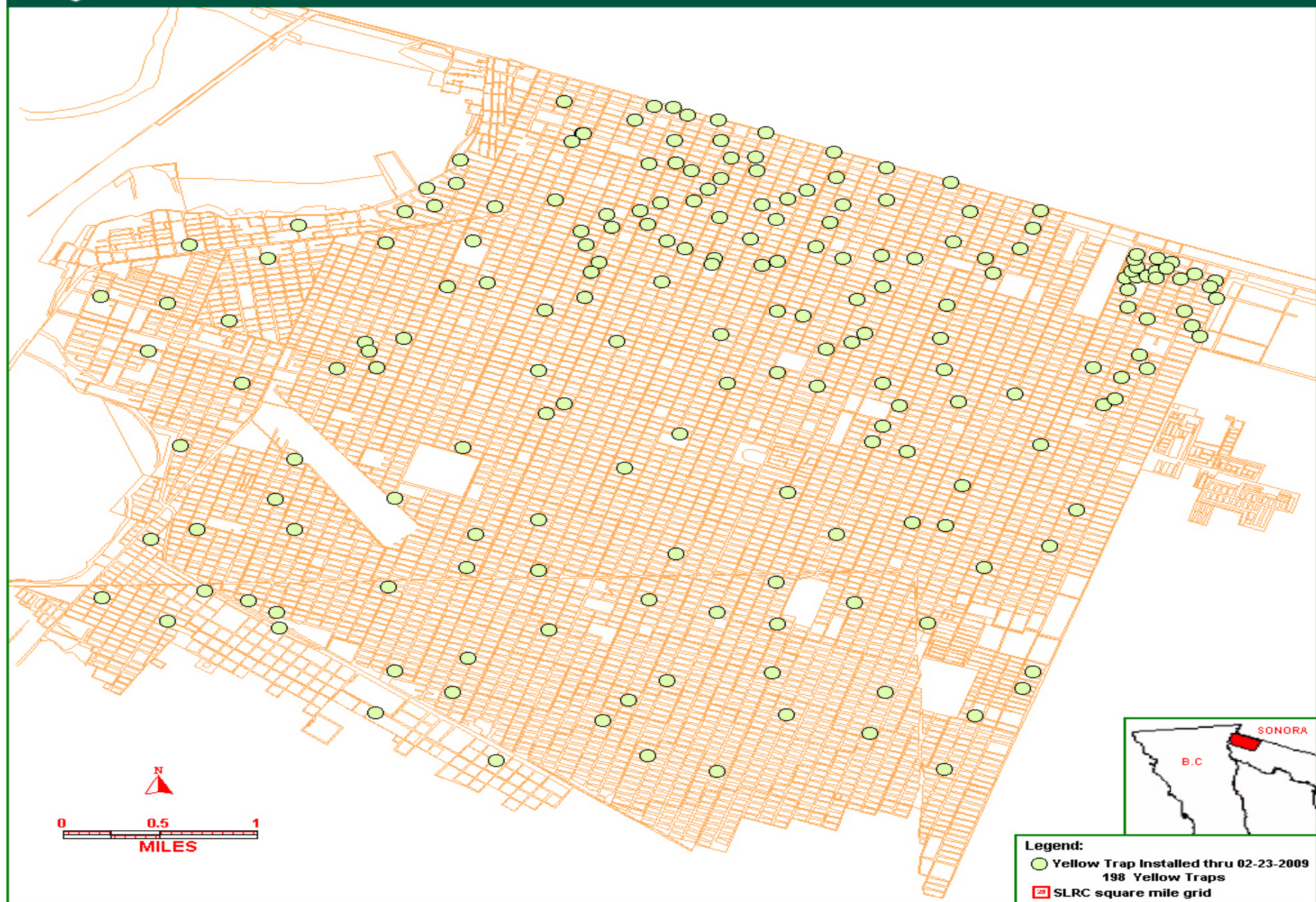


Asian Citrus Psyllid Cooperative Program Rosarito, Baja California





Asian Citrus Psyllid Cooperative Program San Luis Rio Colorado, Sonora, Mexico





Foliar insecticide: Muralla Max (19.60% Imidacloprid; 8.40 Betacyfluthrin).

Soil insecticides: Manager 350SC (32.65% Imidacloprid) and Confidor (30.20% Imidacloprid).





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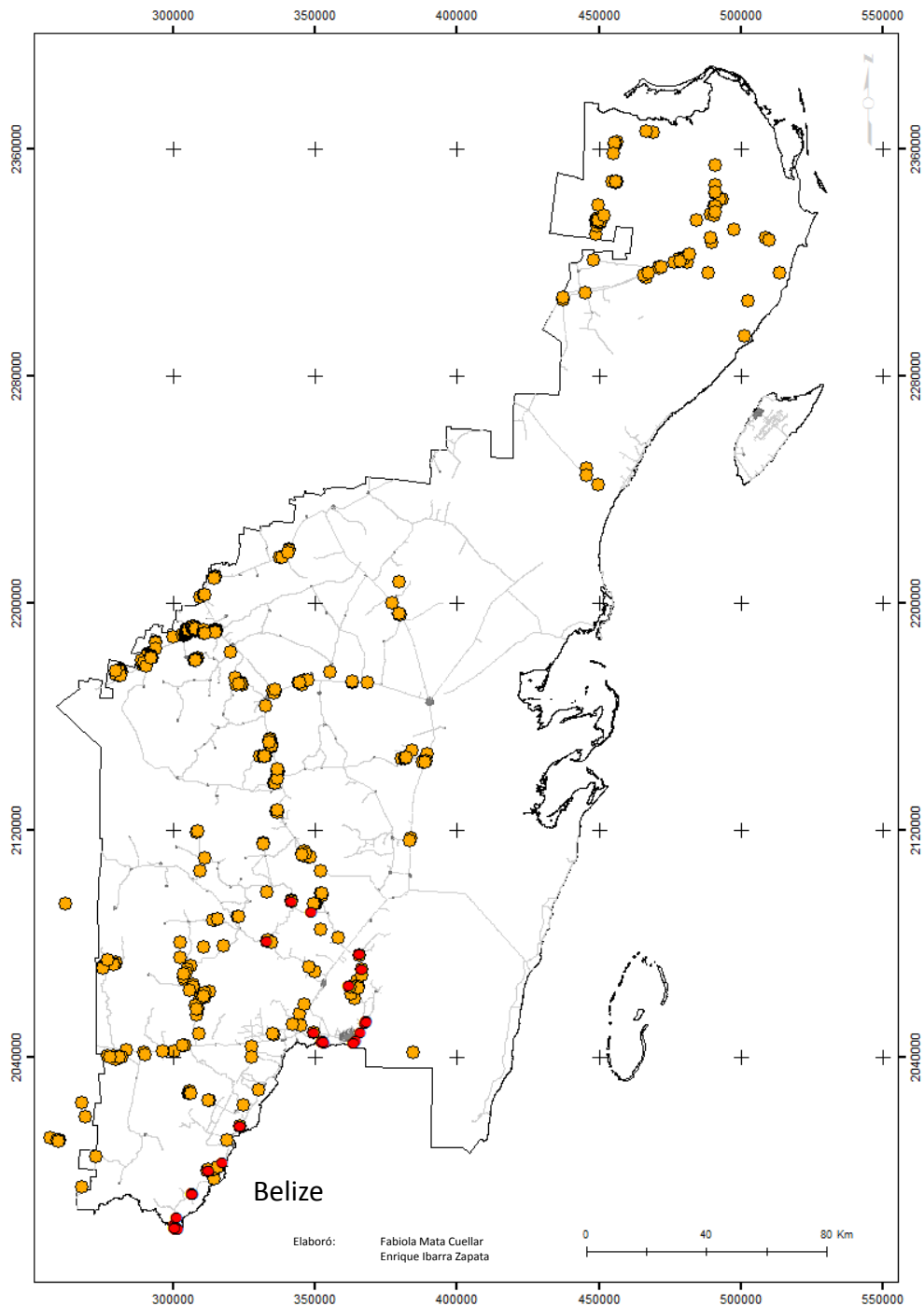
Photo by Hilda D. Gómez

Activities in Quintana Roo derived from the detection of the psyllid in Belize

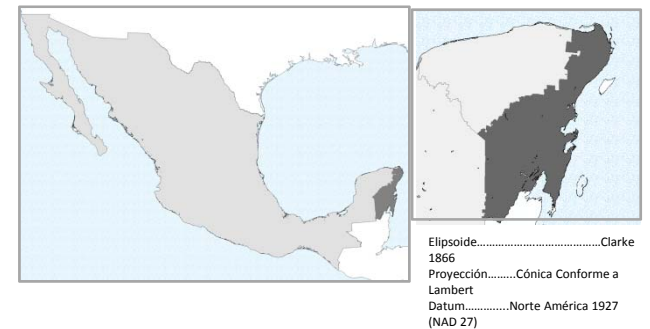
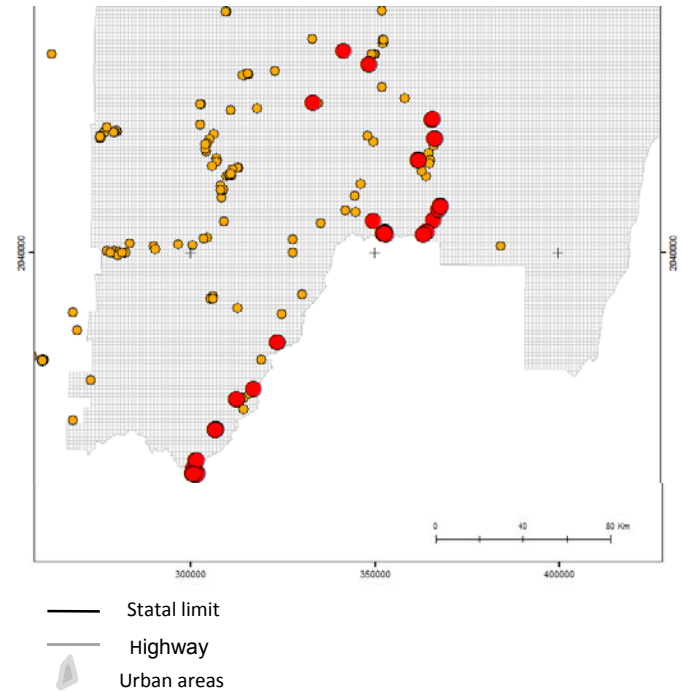
Junio 2009



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- Citrus Orchards (4,816 ha).
- Detection surveys and vector sampling for diagnosis (17th to 23th may).



Town	ACP		Plant material		Total
	Orange Jasmine	Citrus	Orange Jasmine	Citrus	
Blanca flor	0	3	0	1	4
Zona Urbana	5	0	1	0	6
Calderitas	4	0	0	0	4
La Península	0	1	0	1	2
Laguna Guerrero	0	2	0	5	7
Huay-Pix	0	1	0	0	1
Subteniente López	11	0	0	0	11
Rovirosa	1	1	0	3	5
La Unión	10	2	0	1	13
Esteban B. Calderón	5	2	0	0	7
Pucte	0	1	0	2	3
Juan Sarabia	0	1	0	0	1
Xul-Ha	0	1	0	0	1
Sabidos	2	1	0	2	5
Total	38	16	1	15	70

All negative results





Taller internacional sobre plagas cuarentenarias de los cítricos / International workshop on citrus quarantine pests

Villahermosa, Tabasco, México

Hotel Camino Real / Camino Real Hotel

Julio / July 27-31, 2009

Objetivo / Objective:

Preparar a personal técnico en el manejo del HLB, leprosis, cancro y clorosis variegada de los cítricos / Prepare technical staff for the management of HLB, leprosis, canker and citrus variegated chlorosis.

Thanks

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Photo by Hilda D. Gómez

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Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria