

Brown Marmorated Stink Bug IPM Working Group Meeting

Plant Health Task Force of PROCINORTE:

Activities in Mexico against BMSB

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June 10-12, 2013. Bridgeton, NJ.



Cooperative Program in Agricultural Research and Technology for the Northern Region

Plant Health Task Force of PROCINORTE: Activities in Mexico against BMSB

Outline

- ❑ The Plant Health Task of Procinorte**
- ❑ Raising Awareness. Plans of the Mexican Government vs BMSB**
- ❑ Potential Development of BMSB in Mexico**
- ❑ Biological Control of BMSB in Mexico.**
- ❑ Communication with the public.**



PROCINORTE

Programa Cooperativo de Investigación y Tecnología para la Región Norte

Priscila Henríquez

Executive Secretariat

Inter-American Institute for Cooperation on Agriculture (IICA)



VISION

PROCINORTE

The governments of Canada, Mexico, and the USA working together, in consensus, and through their national agricultural research institutions for problem-solving and supporting agriculture in the North American region with science, improved technology, and scientifically-based policy advice

NORGEN

A vibrant, consolidated task force, with a relevant impact on the genetic resources programs of Canada, Mexico, and the USA.

TROPICAL AND SUBTROPICAL FRUITS

A specialized network that contributes science and technology solutions to production, quality, and consumption of tropical and subtropical fruits in the North American Region

ANIMAL HEALTH

A collaboration of government experts that enhances research collaboration, diagnostic harmonization and technology transfer in animal health between Canada, the United States and Mexico.

PLANT HEALTH

To be recognized as the technical and scientific network supporting the coordinated trilateral approach to enhance plant health in North America.



Plant Health Task Force



Tara Gariepy

Agriculture and Agri-Food Canada
Science and Technology Branch

Deb Fravel

United States Department of Agriculture
Agricultural Research Service

José Isabel Lopez-Arroyo

Instituto Nacional de Investigaciones
Forestales Agrícolas y Pecuarias



MISSION

PROCINORTE

To strengthen government-led collaboration in agricultural science for research and policy advice, contributing to problem-solving to support trade, helping target agricultural research on tri-lateral issues, and reaching out to other American countries, regional and global research networks.

PLANT HEALTH TASK FORCE

To develop and share knowledge and technology to promote sustainable management of arthropod pests, diseases, nematodes, and weeds that deleteriously affect crop production in North America, as well as to prevent the introduction, establishment, and spread of invasive species affecting plant health.



NICHE

PROCINORTE

It is the only mechanism available to these three countries to use agricultural science in their public sector organizations to help solve trilateral problems of common concern in their agricultural sectors

PLANT HEALTH TASK FORCE

The Plant Health Task Force generates and disseminates scientific knowledge to better understand and rationally manage plant pests both regulated and un-regulated. In this regard is substantially different from the North American Plant Protection Organization (NAPPO) which doesn't have a research mandate.



STRATEGIC OBJECTIVES

PROCINORTE

- 1) Focus on trilateral transborder issues for commercial agriculture in Canada, Mexico, and USA.
- (2) Build or strengthen linkages to regulatory counterparts, and to appoint office-holders to PROCINORTE roles.
- (3) Seek a more intensive collaboration among the three countries, while exploring the use of modern information technologies to facilitate learning and decrease the costs of communications.

PLANT HEALTH TASK FORCE

- Promote joint research projects
- Capacity building and linking specialists and projects for proactive research on invasive pests and diseases
- Promote knowledge sharing on pests/diseases of tri-lateral interest through several means
- Carry out outreach activities with other countries and regions in Latin American countries



Quarantine Pests

Resources for Management: SCARCE!!



SAGARPA

SECRETARÍA DE AGRICULTURA,
GANADERÍA, DESARROLLO RURAL,
PESCA Y ALIMENTACIÓN



SENASICA

SERVICIO NACIONAL DE SANIDAD,
INOCUIDAD Y CALIDAD
AGROALIMENTARIA



Sistema Nacional de
Vigilancia Epidemiológica
Fitosanitaria
SINAVEF

Selection of Targets: Risk analysis



NO.	PLAGA
1	Ácaro rojo de las palmas (<i>Raoiella indica</i>)
2	Picudo rojo de las palmas (<i>Rhynchophorus ferrugineus</i>)
3	Cogollo racimoso del banano (Banana Bunchy Top Virus)
4	Mal de Panamá (<i>Fusarium oxysporum</i> f.sp. <i>cubense</i> raza 4)
5	Marchitez bacteriana del plátano (<i>Xanthomonas campestris</i> <i>vasicola</i> pv. <i>musacearum</i>)
6	Moko del plátano (<i>Ralstonia solanacearum</i> raza 2)
7	Cancro bacteriano de los cítricos (<i>Xanthomonas citri</i> subsp. <i>citri</i>)
8	Leprosis de los cítricos-Vectores (Citrus Leprosis Virus)
9	Clorosis variegada de los cítricos-Vectores (<i>Xylella fastidiosa</i> subsp. <i>pauca</i>)
10	Mancha negra de los cítricos (<i>Guignardia citricarpa</i>)
11	Palomilla del nopal (<i>Cactoblastis cactorum</i>)
12	Palomilla del tomate (<i>Tuta absoluta</i>)
13	Cochinilla rosada del hibisco (<i>Maconellicoccus hirsutus</i>)
14	Enfermedad de Pierce (<i>Xylella fastidiosa</i> subsp. <i>fastidiosa</i>)
15	Fusariosis de la piña (<i>Fusarium guttiforme</i>)

Se vigilarán en 31 Estados.

Nota: El número no indica una posición de priorización.

Selection of Targets: Risk analysis



NO.	PLAGA
16	Tortricido anaranjado (<i>Argyrotaenia franciscana</i>)
17	Palomilla oriental de la fruta (<i>Grapholita molesta</i>)
18	Palomilla marrón de la manzana (<i>Epiphyas postvittana</i>)
19	Palomilla europea de la vid (<i>Lobesia botrana</i>)
20	Carbón parcial del trigo (<i>Tilletia indica</i>)
21	UG99 Roya negra del tallo (<i>Puccinia graminis</i> f. sp. <i>tritici</i> UG99)
22	Complejo Tea shot hole borer (<i>Euwallacea fornicatus-Fusarium</i> sp.)
23	Complejo Escarabajo ambrosia del laurel rojo (<i>Xyleborus glabratus-Raffaelea lauricola</i>)
24	Roya anaranjada de la caña de azúcar (<i>Puccinia kuehnii</i>)
25	Mosca del vinagre de alas manchadas (<i>Drosophila suzukii</i>)
26	Roya asiática de la soya (<i>Phakopsora pachyrhizi</i>)
27	Pulgón café de los cítricos (<i>Toxoptera citricida</i>)
28	Escoba de bruja del cacao (<i>Moniliophthora perniciosa</i>)
29	Roya del café (<i>Hemileia vastatrix</i>) : Sólo Tabasco

Se vigilarán en 31 Estados.

Nota: El número no indica una posición de priorización.

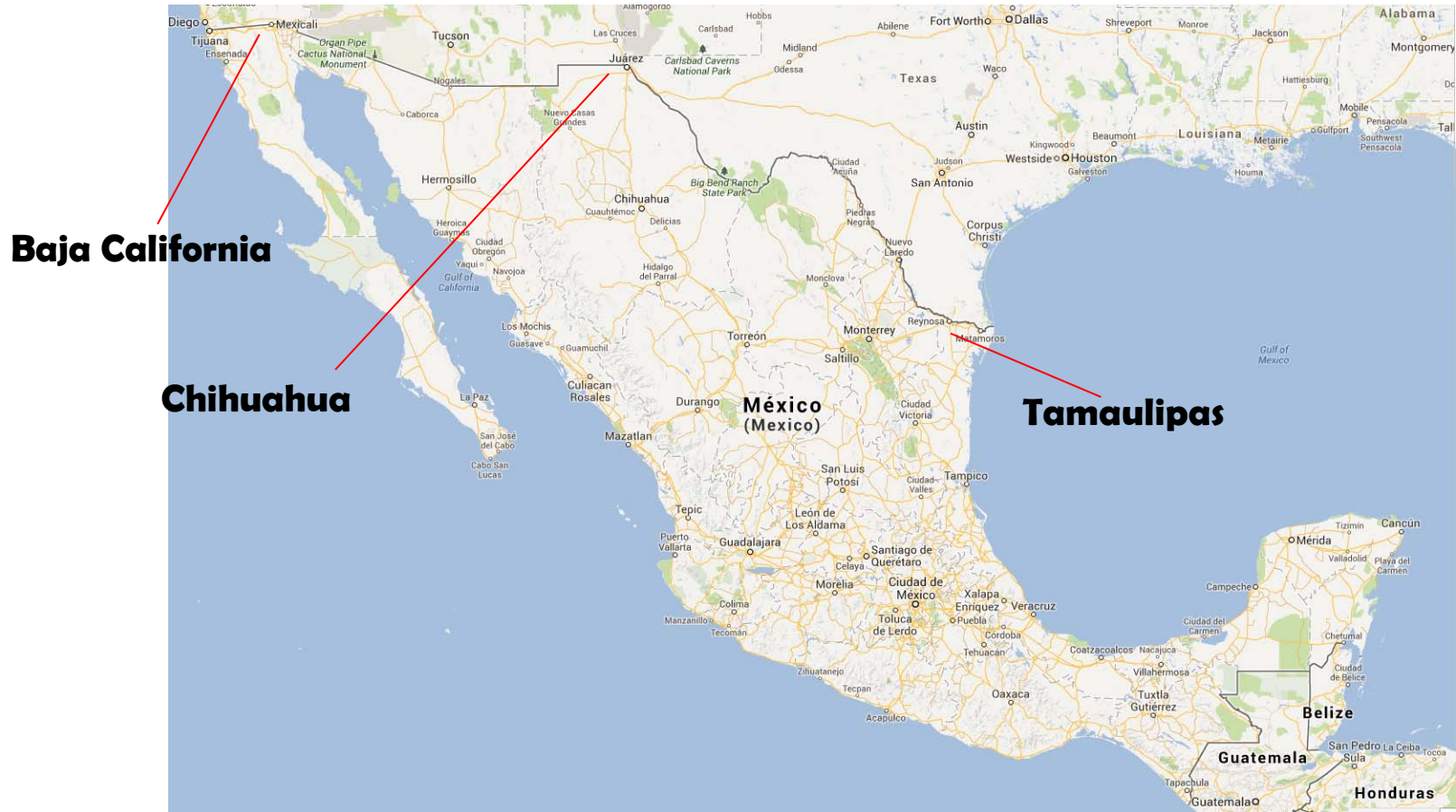
Pests under passive supervision



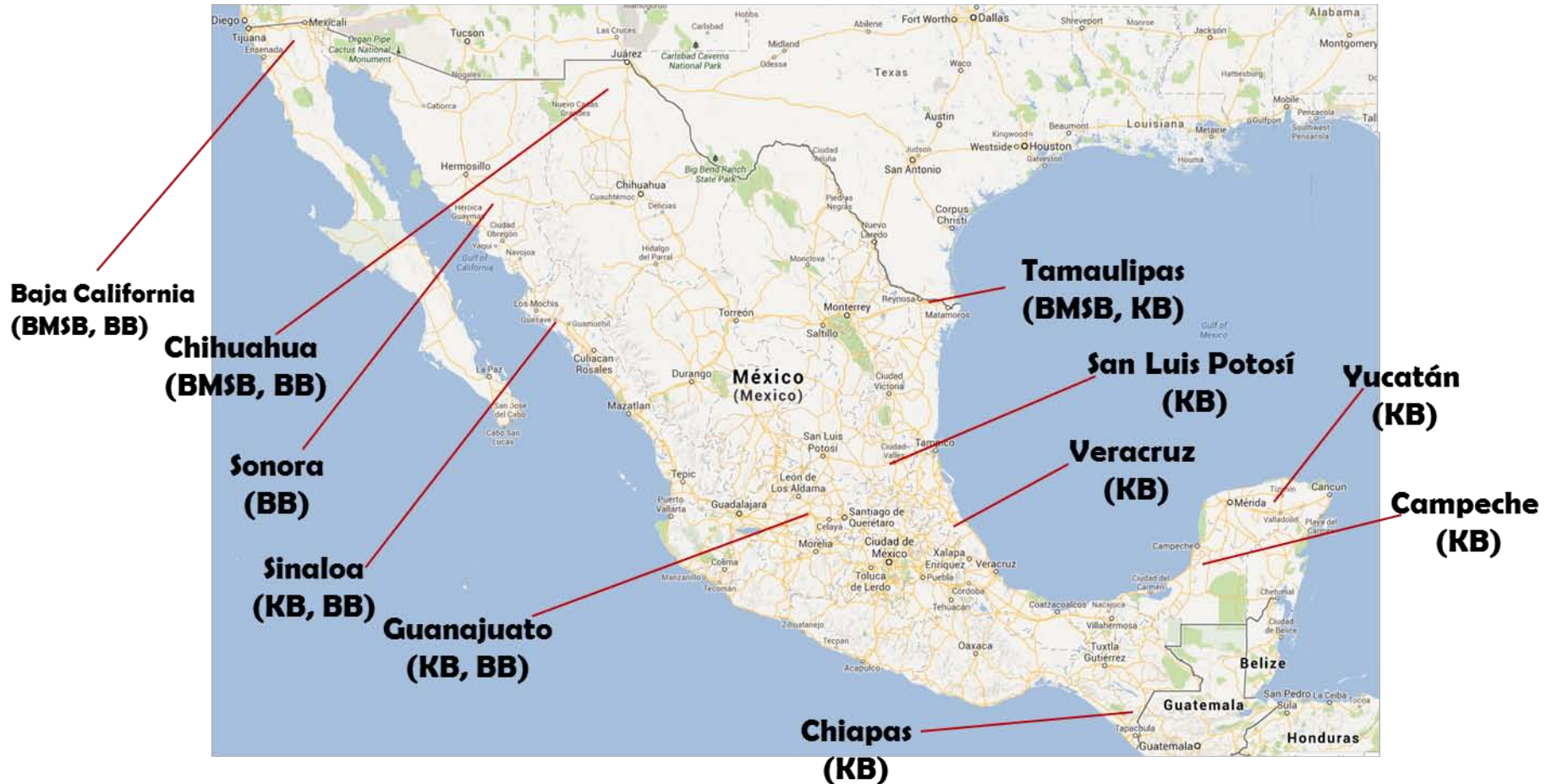
Scientific name	Common name
1. <i>Lissachathina fulica</i>	East african land snail
2. <i>Bagrada hilaris</i>	Bragada bug
3. <i>Halyomorpha halys</i>	BM\$B
4. <i>Pantoea ananas</i>	Brown rot of pineapple
5. <i>Phytophthora ramorum</i>	Sudden oak death
6. <i>Megacopta cribraria</i>	kudzu bug
7. <i>Meloidogyne chitwoodii</i>	Columbia root-knot nematode
8. <i>Ditylenchus destructor</i>	Potato tuber nematode
9. <i>Globodera rostochiensis</i>	Golden nematode
10. <i>Synchytrium endobioticum</i>	Potato wart disease
11. <i>Clavibacter michiganensis</i> subsp <i>sepedonicus</i>	Ring rot
12. <i>Ralstonia solanacearum</i> biovar 3	Bacterial wilt of potato
13. <i>Phytophthora palmivora</i>	Bud-rot of palms
14. <i>Tecia solanivora</i>	Guatemalan potato moth

SENASICA PEST MONITORING PROGRAM FOR 2013

Mexican States under Monitoring for BMSB



SENASICA PEST MONITORING PROGRAM FOR 2013 Mexican States with Monitoring for Hemipteran Bugs



BMSB, *Halyomorpha halys*

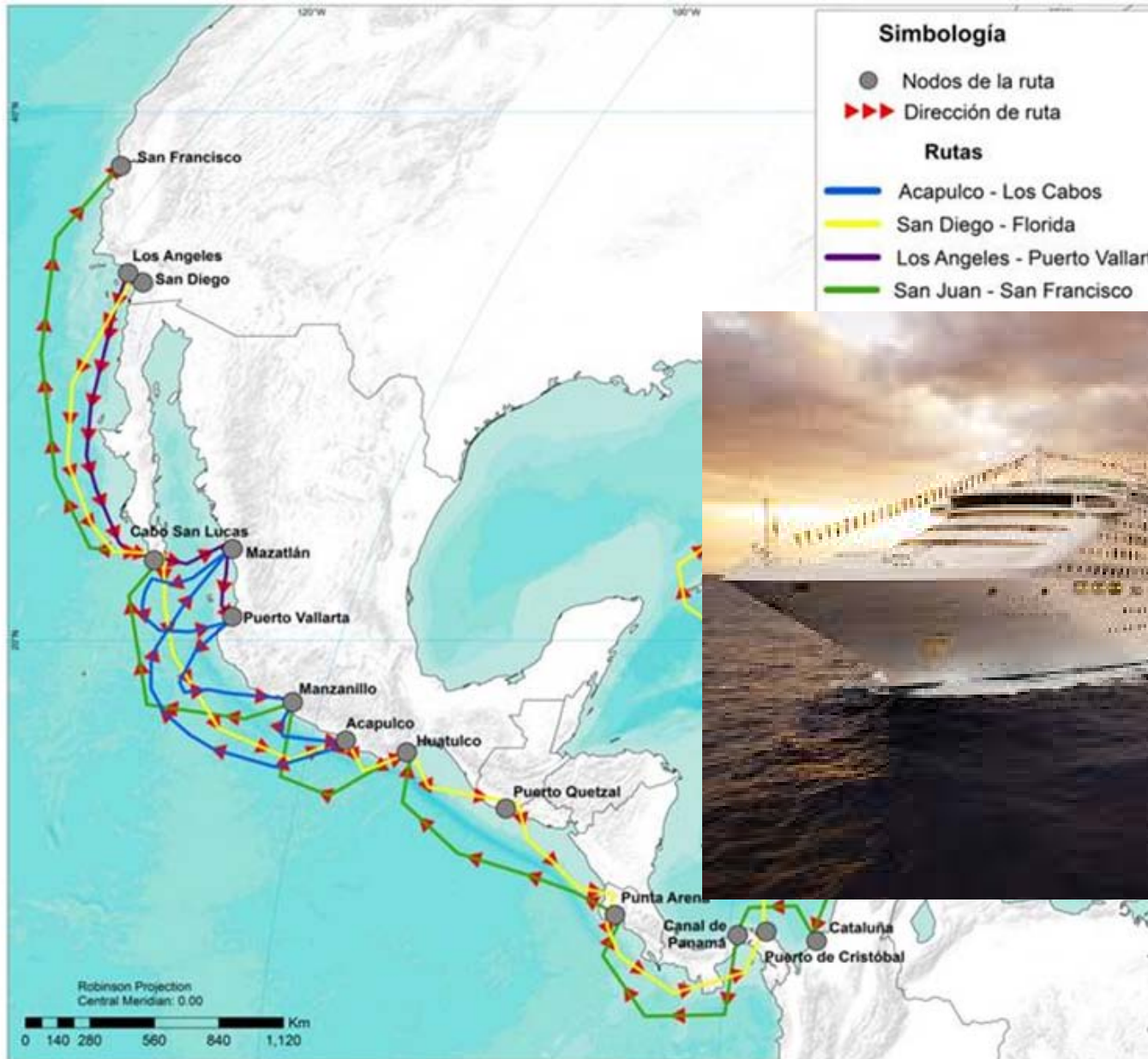
KB, Kudzu bug, *Megacopta cribaria*

BB, Bagrada bug, *Bagrada hilaris*



Raising awareness

The Fast way to reach central Mexico



Field Samplings

Main risk areas: Crops, Wild areas



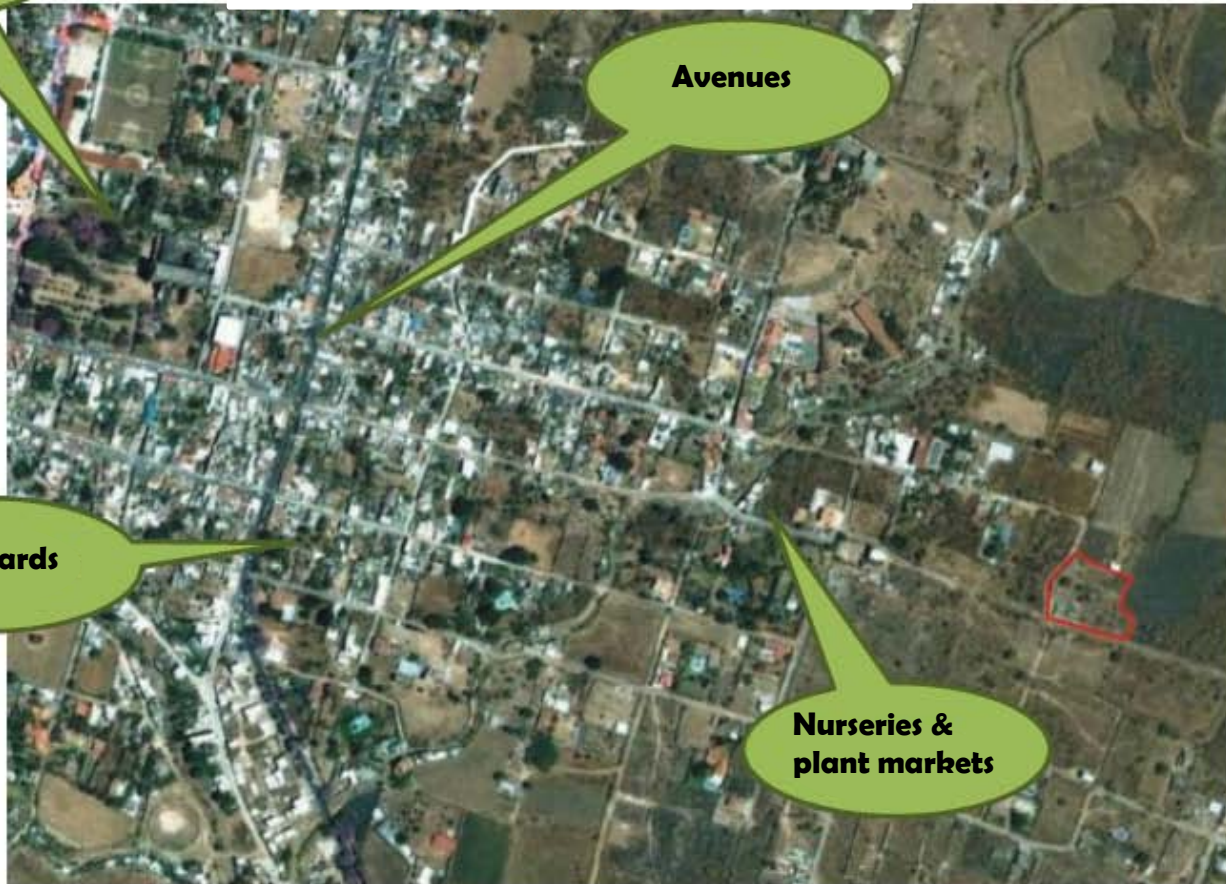
Urban Samplings

Parks & gardens

Avenues

Home yards

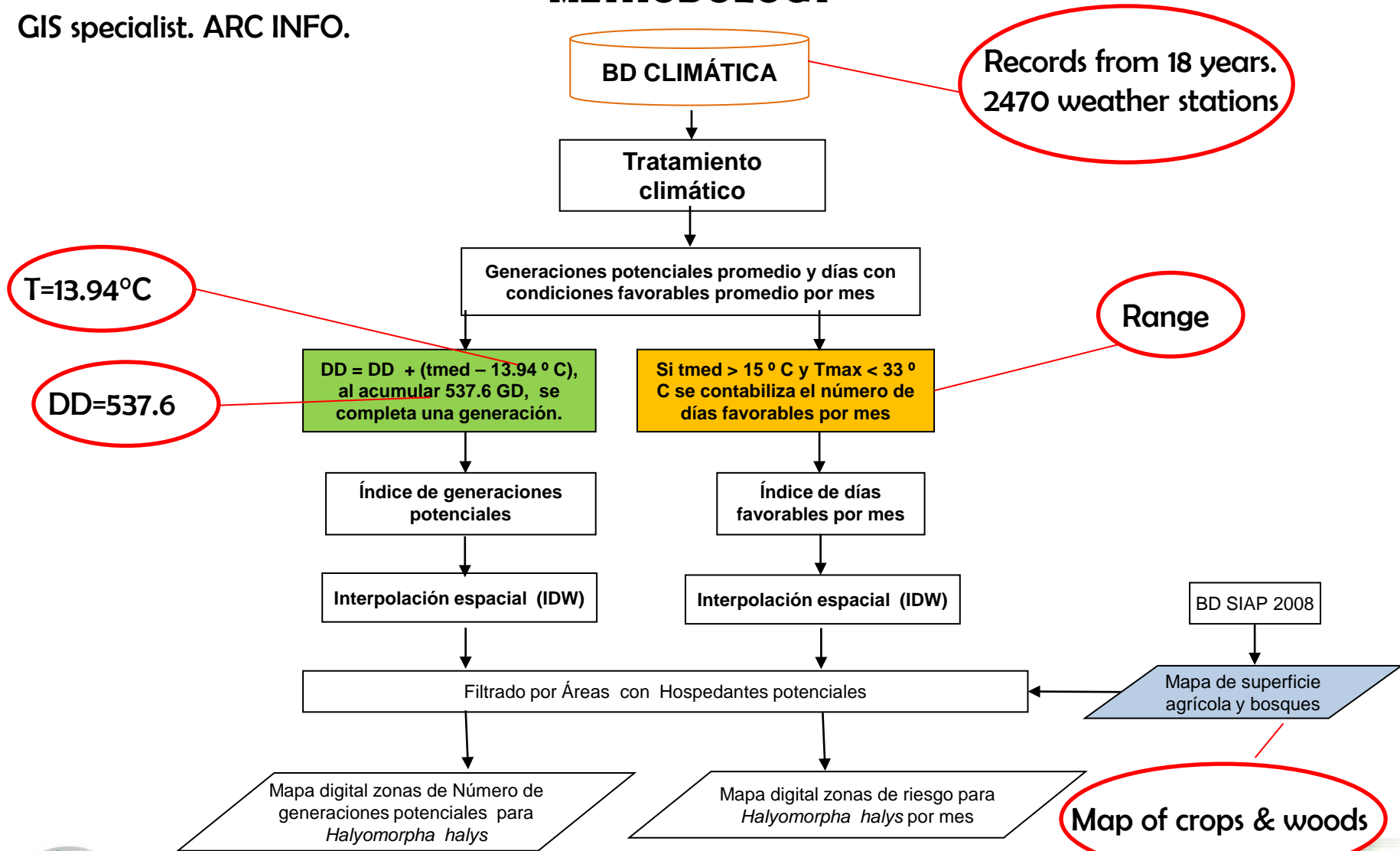
Nurseries & plant markets



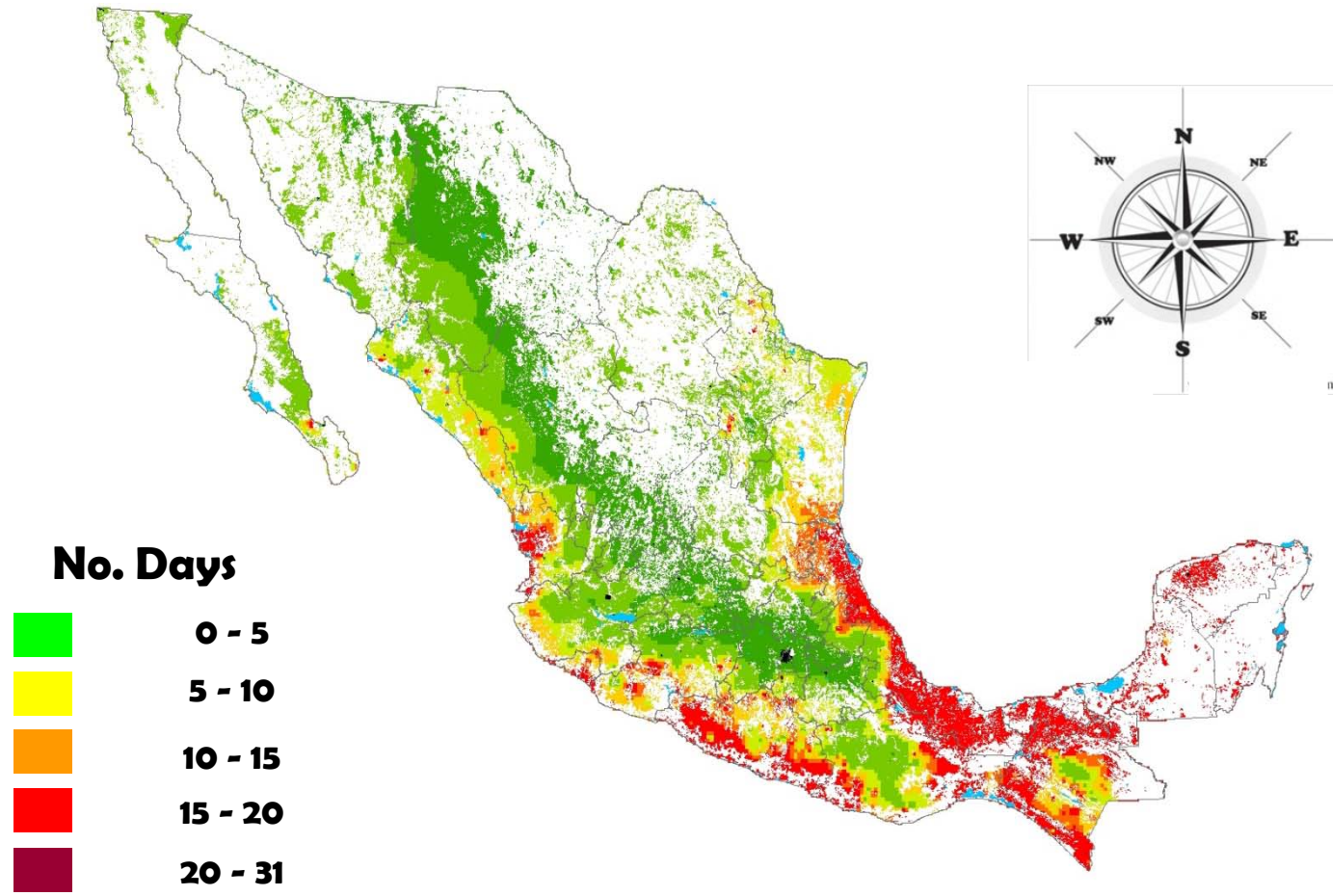
Potential Development of BMSB in Mexico

METHODOLOGY

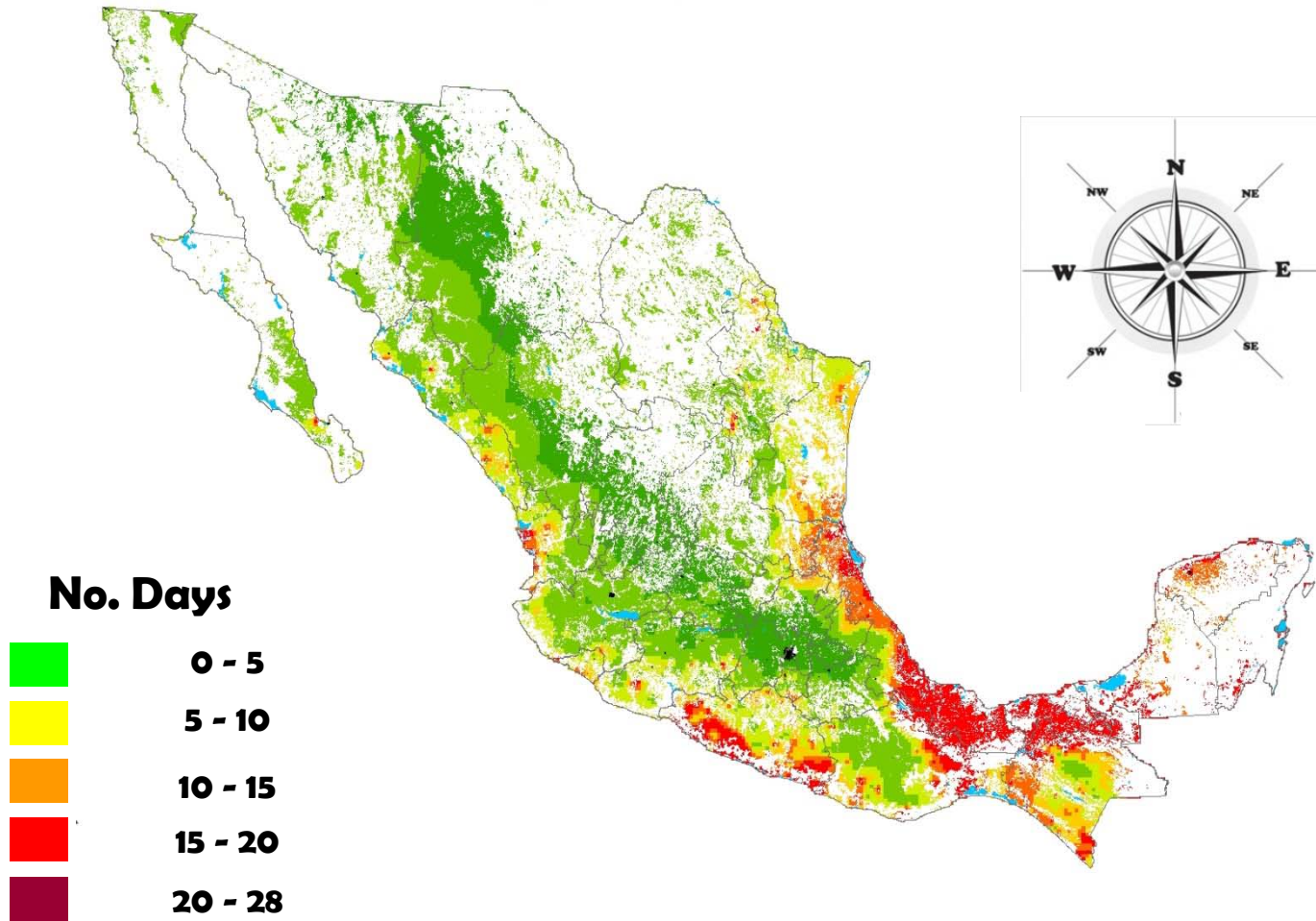
GIS specialist. ARC INFO.



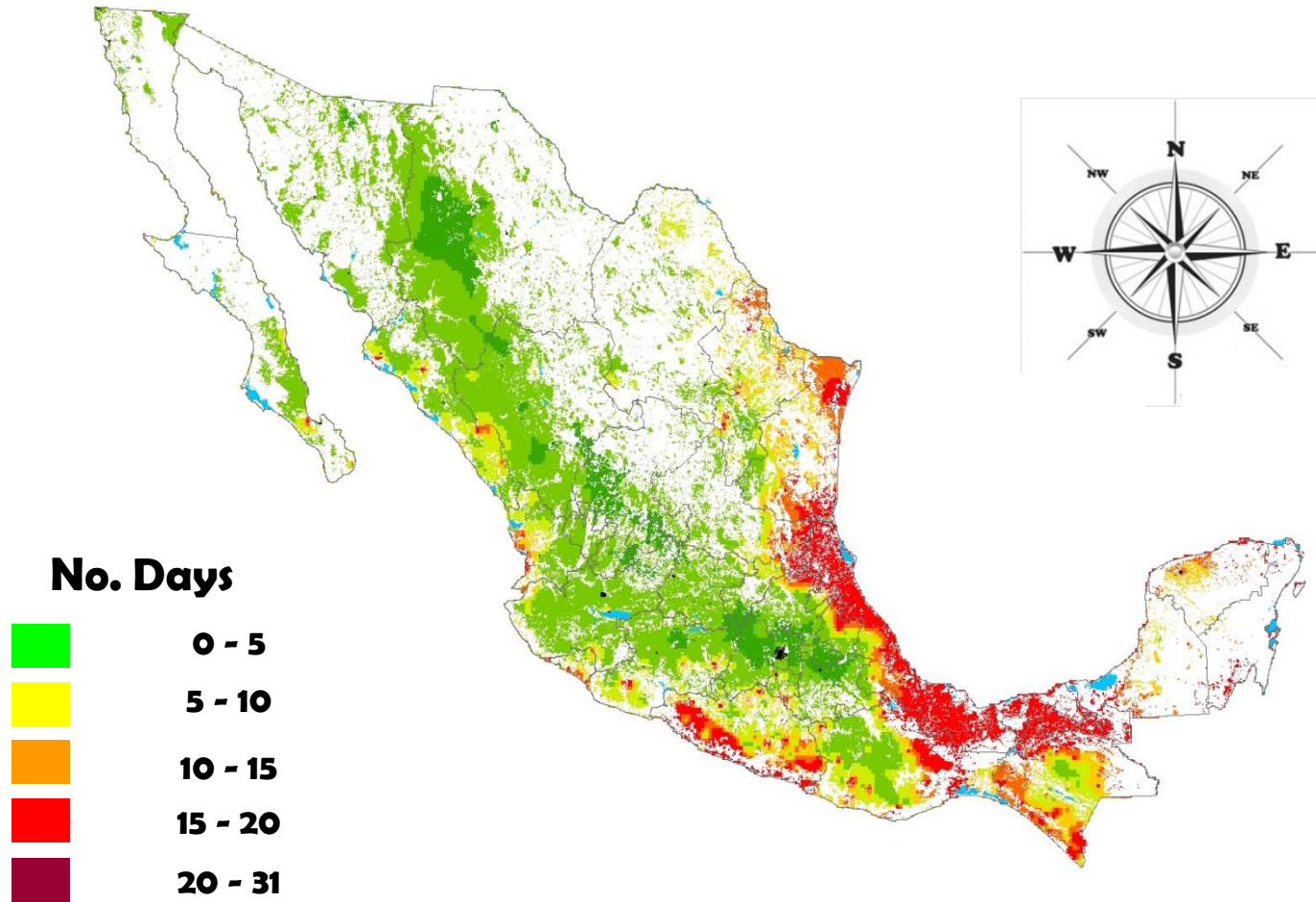
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during January



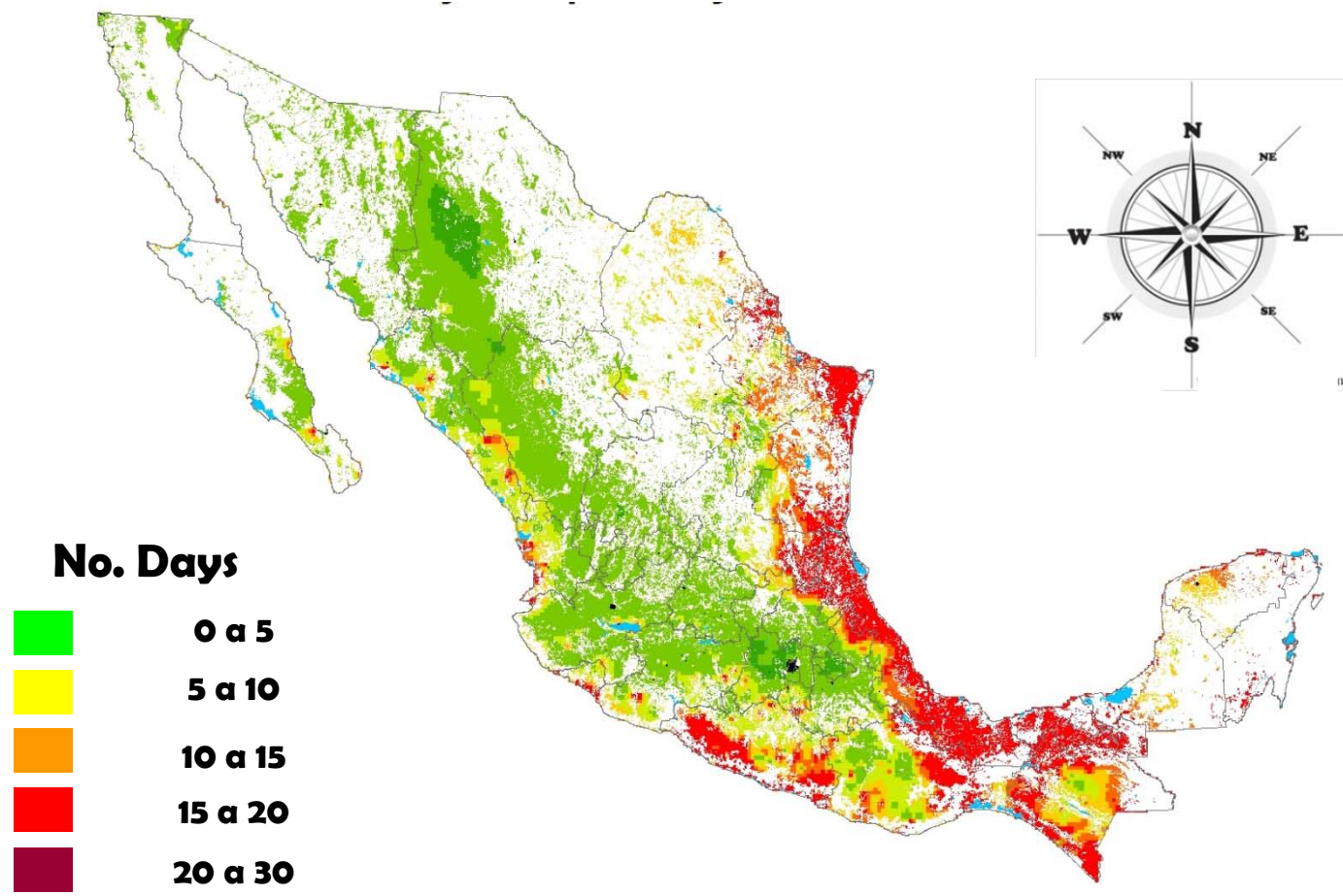
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during February



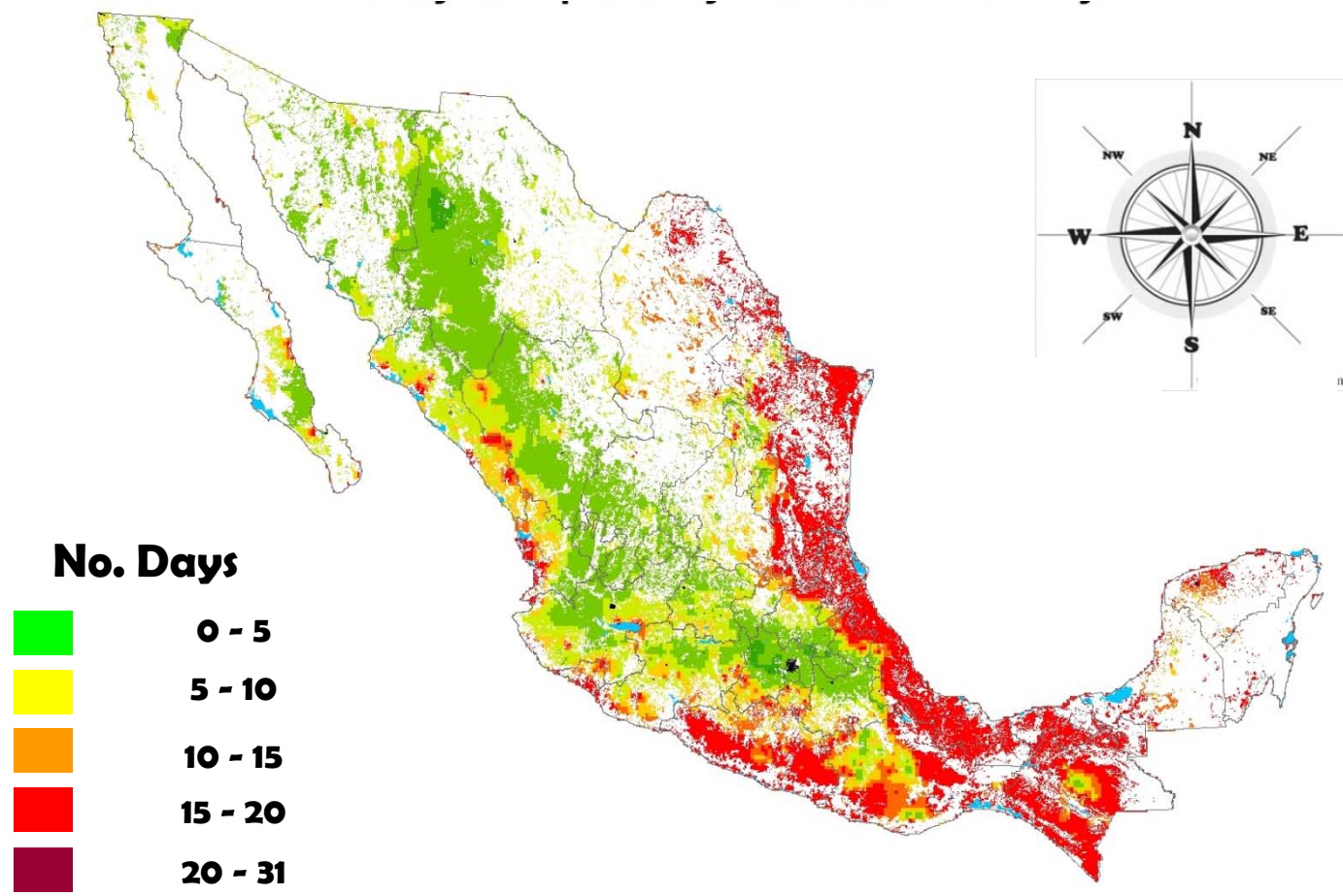
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during March



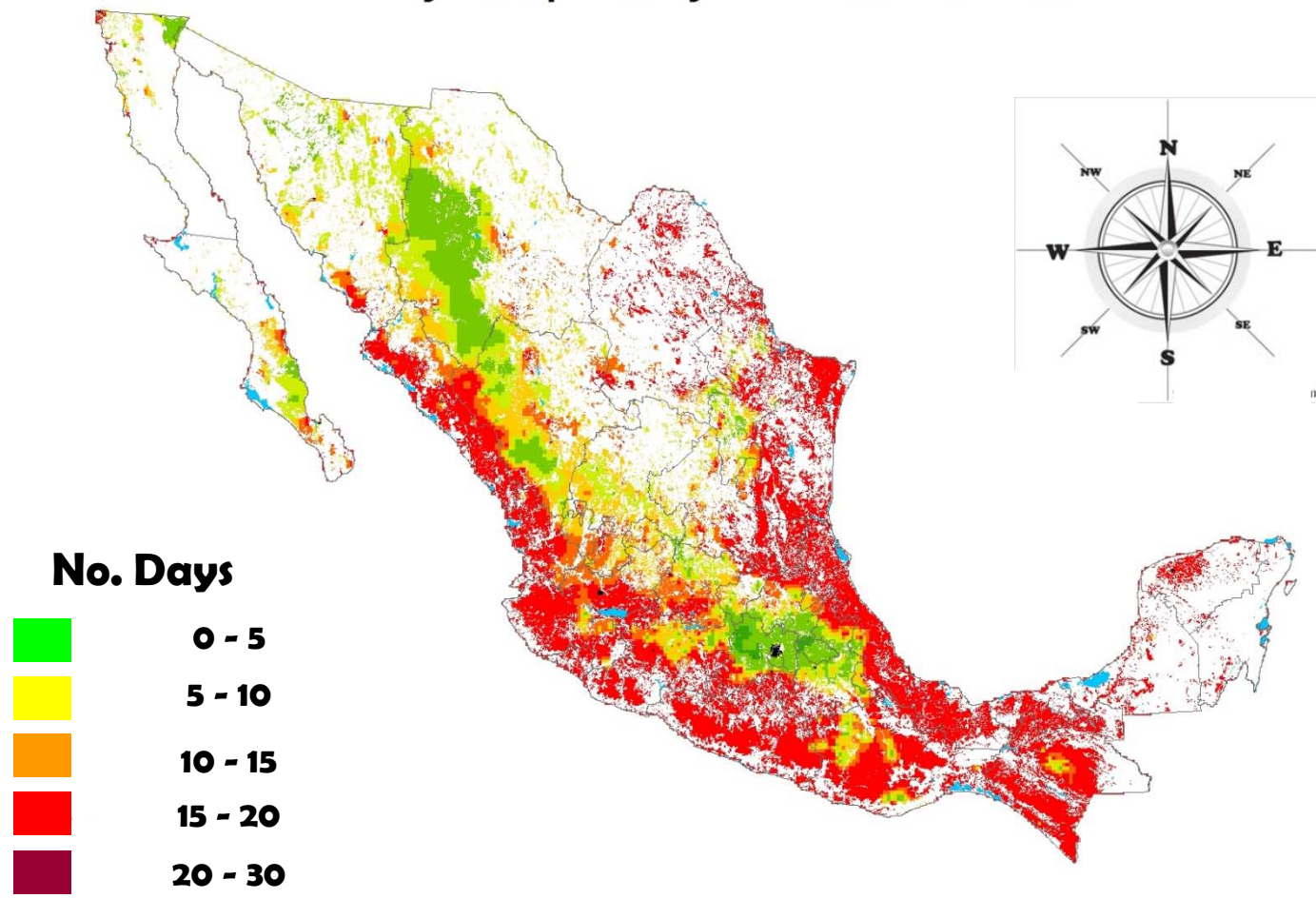
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during April



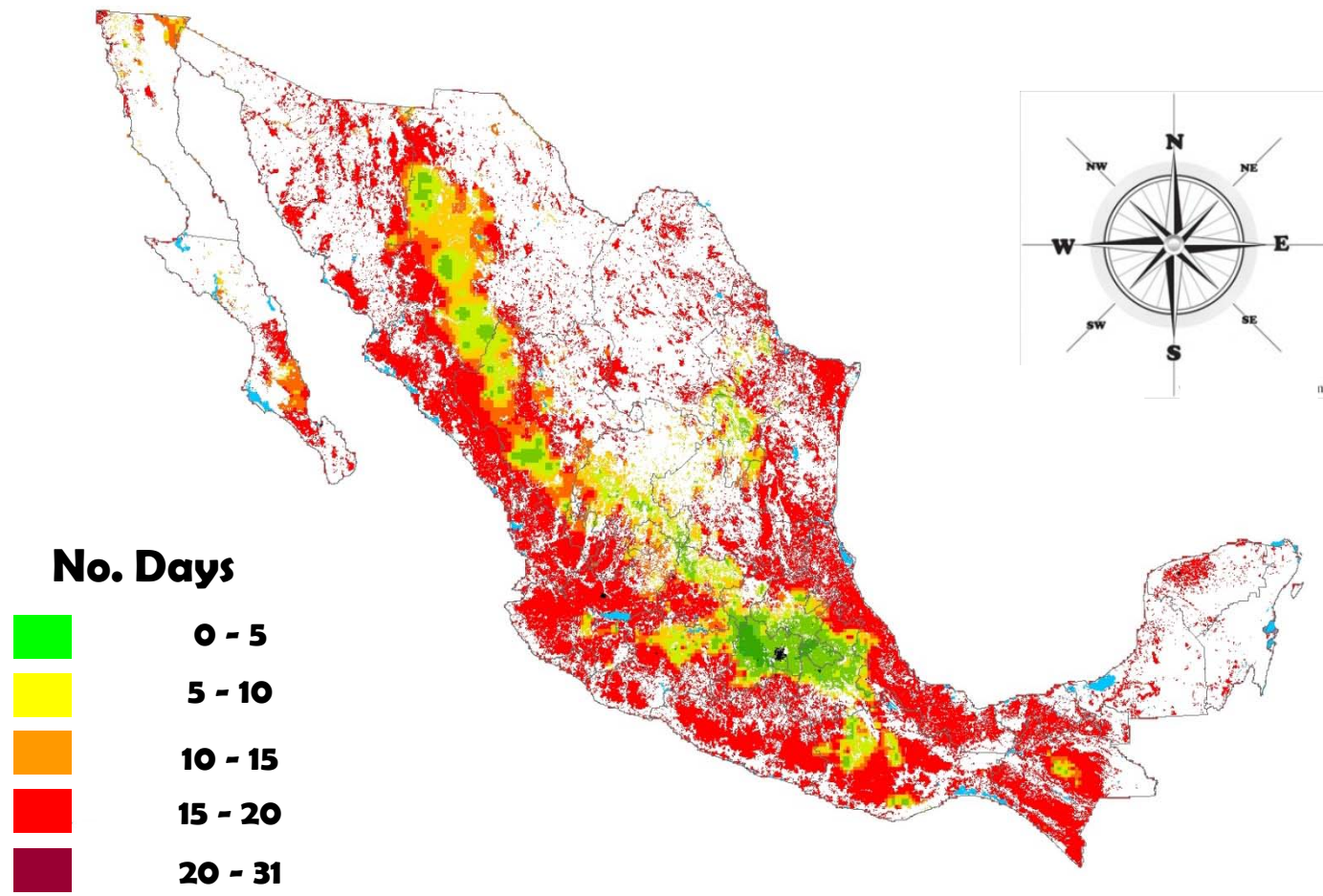
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during May



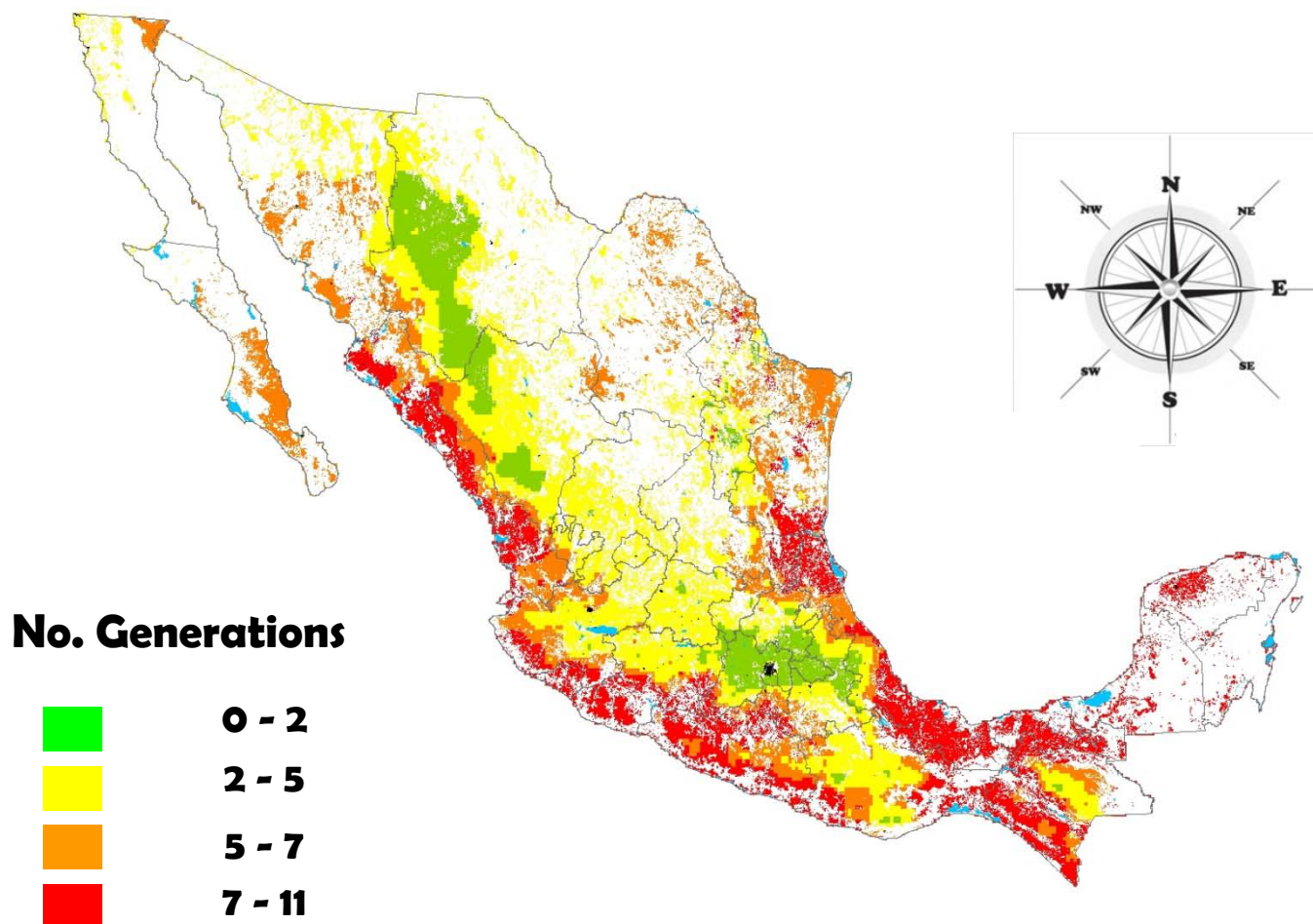
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during June



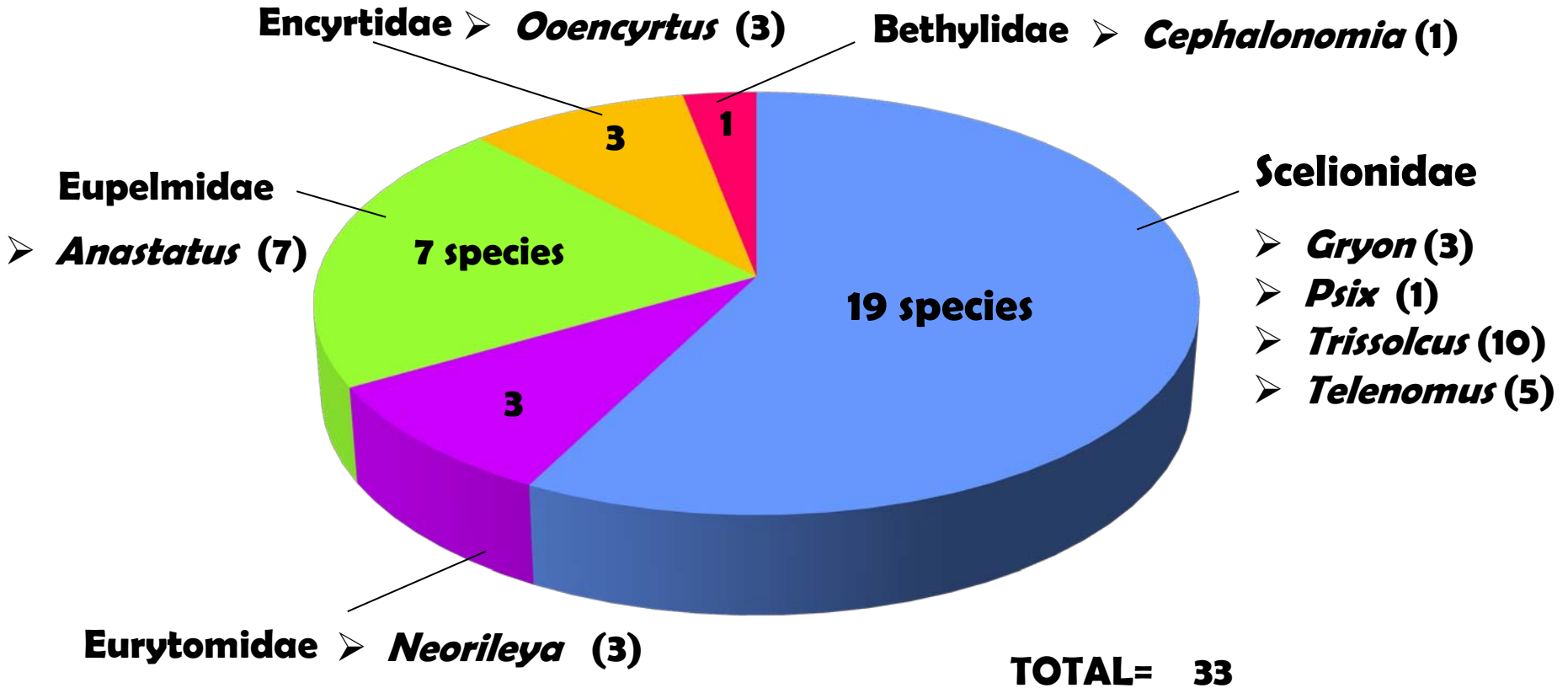
Days presenting favorable conditions for development of BMSB, *Halyomorpha halys*, during July



Potential development of BMSB, *Halyomorpha halys*, in Mexico



NATURAL ENEMIES OF PENTATOMID EGGS IN MEXICO



NATURAL ENEMIES OF PENTATOMID EGGS IN MEXICO

HYMENOPTERA: Scelionidae

Species	Mexican states	Region
<i>Gryon</i> sp.	Chihuahua	North
<i>Gryon parkeri</i> (Fouts)	Nuevo León, Tamaulipas	North
<i>Gryon pensylvanicum</i> (Ashmead)	Chihuahua, Nuevo León	North
<i>Psix tunetanus</i> Mineo & Szabó	Coahuila, Nuevo León	North
<i>Trissolcus</i> sp.	Coahuila, Chihuahua, Nuevo León, Tamaulipas	North
<i>Trissolcus ashmeadi</i> (Morrill)	Chihuahua	North
<i>Trissolcus basalis</i> (Wollaston)	Tamaulipas	North
<i>Trissolcus brochymena</i> (Ashmead)	Coahuila, Nuevo León Tamaulipas, Veracruz	North, South
<i>Trissolcus edessae</i> Fouts	Nuevo León	North



HYMENOPTERA: Scelionidae

Species	Mexican states	Region
<i>Trissolcus euschisti</i> (Ashmead)	Coahuila, Chihuahua, Nuevo León,	North
<i>Trissolcus hullensis</i> (Harrington)	Coahuila, Chihuahua, Nuevo León, Tamaulipas	North
<i>Trissolcus uthaensis</i> (Ashmead)	Coahuila, Chihuahua	North
<i>Trissolcus radix</i> Johnson	Coahuila	North
<i>Trissolcus solocis</i> Johnson	Coahuila	North
<i>Telenomus cristatus</i> Johnson	Tamaulipas	North
<i>Telenomus electus</i>	Veracruz	South
<i>Telenomus goliathus</i> Johnson	Chihuahua	North
<i>Telenomus podisi</i> Ashmead	Baja California Sur, Morelos, Tamaulipas	North, South
<i>Telenomus smithi</i> Ashmead		



HYMENOPTERA: Eurytomidae

Species	Mexican states	Region
<i>Neorileya</i> Ashmead	Chihuahua	North
<i>Neorileya ashmeadi</i> Crawford	Chihuahua, Puebla	North, South
<i>Neorileya flavipes</i> Ashmead	Chiapas, Veracruz	South

HYMENOPTERA: Eupelmidae

Species	Mexican states	Region
<i>Anastatus</i> sp. Motschulsky	Chihuahua	North
<i>Anastatus ashmeadi</i>	Quintana Roo	South
<i>Anastatus reduvii</i> (Howard)	Chihuahua, Nuevo León	North
<i>Anastatus floridanus</i> Roth & Willis	Quintana Roo	South
<i>Anastatus rhadinosos</i>	Quintana Roo	South
<i>Anastatus mirabilis</i> (Walsh & Riley)	Quintana Roo	South
<i>Anastatus semiflavus</i> Gahan	Quintana Roo	South

HYMENOPTERA: Encyrtidae

Species	Mexican states	Region
<i>Ooencyrtus sp. Ashmead</i>	Chihuahua, Baja California	North
<i>Ooencyrtus nr. johnsoni</i>	San Luis Potosí	North
<i>Ooencyrtus trinidadensis Crawford</i>	Morelos	South

HYMENOPTERA: Bethyilidae

Species	Mexican states	Region
<i>Cephalonomia</i>	Chihuahua	North

Recovered from BMSB (Dieckhoff *et al.*, 2013)



Biological Control



Fig.3. *Trissolcus hullensis* (Scelionidae)



Fig.4. *Telenomus podisi* (Scelionidae)



Fig. 5. *Anastatus redivii* (Eupelmidae)



Fig.6. *Neorileya ashmeadi* (Eurytomidae)



Biological Control



Fig. 7. *Ooencyrtus* sp. (Encyrtidae)



Fig. 8. Pteromalidae parasitoid



Biological Control

NATURAL ENEMIES OF PENTATOMID BUGS IN MEXICO

HOSTS

1. *Acrosternum hilare*,
2. *Brochymena sulcata*
3. *Chlorochroa ligata*
4. *Euschistus sp.*
5. *Haematoxylon brasiletto*
6. *Murgantia histrionica*
7. *Nezara viridula*
8. *Thyanta custator*



THE NATIONAL CENTER FOR BIOLOGICAL CONTROL

SAGARPA, SENASICA, CNRCB, Tecomán, Colima, Mexico



Use of Generalist Predators



MEXICAN NETWORK OF COMMERCIAL MASS-
PRODUCTION LABS OF BENEFICIAL INSECTS

Management of the Sorghum Brown Stink Bug, *Oebalus mexicana*



Use of entomopathogenic fungi

- Sorghum yield reduction= 14%
- Chemical control: 12 insecticide applications
- Egg parasitism by *Telenomus* sp.= 68%

Chinche café del sorgo
Oebalus mexicana Sailer



Overwintering sites

Parte inferior de color gris marrón.



Chincheapestosa café marmoleada
Halyomorpha halys

Chinche café
Euschistus servus

Hombro redondeado y manchas blancas y negras en antenas..



Hombro redondeado (obtus)



Hombro afilado (agudo)

Chincheapestosa café marmoleada

Chinche soldado espinosa

CULTIVOS QUE AFECTA

La plaga ataca frijol, maíz, haba, soya, jitomate, chile, pimientos, berenjena, espárragos, chícharo, manzana, pera, durazno, uva, arándanos, frambuesa, fresa, y diversas especies de árboles y plantas ornamentales. Potencialmente puede atacar cítricos, nogal, pistacho, canola, sorgo, olivo y otros cultivos presentes en los estados fronterizos del norte de México.

FACTORES DEL PAISAJE QUE PROPICIAN SU DISPERSIÓN

Caminos, estructuras cercanas a éstos y el uso de suelo podrían potencializar la gravedad del riesgo de dispersión que la chincheapestosa café marmoleada representa para la agricultura. Debido a su amplio rango de plantas hospederas, proteger los cultivos contra esta plaga podría significar una tarea difícil.

“Los especialistas en sanidad vegetal del INIFAP en colaboración con el Servicio Agrícola de Estados Unidos de América y de Canadá, actualmente trabajan para encontrar alternativas de manejo integrado para esta plaga de gran importancia para la región”.

Para mayor información diríjase al:

COMITÉ ESTATAL DE SANIDAD VEGETAL O JUNTAS LOCALES DE SANIDAD VEGETAL en su área

CAMPO EXPERIMENTAL del INIFAP más cercano.

SECRETARÍA DE DESARROLLO AGROPECUARIO en su entidad
Llame en forma gratuita al 01-800-987-987



CHINCHE APESTOSA CAFÉ MARMOLEADA

Halyomorpha halys (Stål)



PELIGRO POTENCIAL PARA LA AGRICULTURA EN MÉXICO



Agriculture and Agri-Food Canada

CHINCHE APESTOSA CAFÉ MARMOLEADA

Halyomorpha halys (Stål)

La chincheapestosa café marmoleada, *Halyomorpha halys* (Stål), es una plaga voraz que daña frutales, hortalizas, cultivos anuales y ornamentales en Norteamérica. Fue accidentalmente introducida al Norte del continente desde Asia a finales de 1990, y a pesar de que en su lugar de origen se reconoce como plaga, el daño causado en Norteamérica ha sido notablemente mayor.



Daños en duraznero

La plaga además invade casas habitación, oficinas, almacenes, granjas y bosques. Posee pocos enemigos naturales y gran abundancia de comida que facilita su reproducción. Ha causado daños catastróficos en Estados Unidos de América, donde se registran pérdidas totales de cultivos como: maíz elotero, pimientos, tomates, manzanas y duraznos.

En E.U.A. se realiza un plan de acción contra la plaga, basado en el entendimiento de su desarrollo poblacional para así implementar un manejo sustentable con trampas, cebos, bioinsecticidas y control biológico.



Daños en maíz

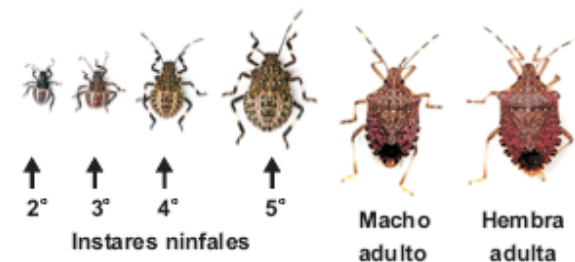
CICLO DE VIDA

La chincheapestosa café marmoleada pasa el invierno como adulto en un periodo de dormancia; los individuos post-dormancia aparecen en primavera. La hembra deposita hasta 486 huevos durante su vida, los cuales



1° instar

son color verde claro y comúnmente se encuentran en el envés de las hojas en grupos de aproximadamente 28. Para desarrollarse como adulto atraviesa por cinco instares ninfales a partir de huevo.

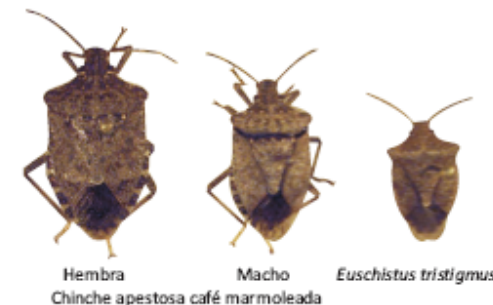


ESPECIES SIMILARES A

Halyomorpha halys

La chincheapestosa marmoleada café podría confundirse con chinches nativas de América del norte, sin embargo se diferencian por las siguientes características:

 **Tamaño.**



Hembra
Chincheapestosa café marmoleada

Macho
Euschistus tristigmus

Atizies taxcoensis , *Euschistus taxcoensis* (Hemiptera: Pentatomidae)



BMSB?



Gracias



PROCINORTE

Cooperative Program in Agricultural Research and Technology for the Northern Region



GENETIC RESOURCES



ANIMAL HEALTH



TROPICAL AND SUBTROPICAL FRUITS



PLANT HEALTH