

**HELICOVERPA ARMIGERA:
FROM EARLY
ASSESSMENTS AND RISK
PRODUCTS TO
REGULATORY DECISION
MAKING**

Dan Borchert
USDA-APHIS-
PPQ-CPHST-
PERAL

HELICOVERPA ARMIGERA- A LOOK BACK

- What was the word on the street?
- What were we saying about it?
- Risk decision tools
 - Analysis
 - Maps
 - Survey recommendations
- Nothing ever goes away on the internet.

FOWLER AND LAKIN, 2001

RISK ASSESSMENT: THE OLD WORLD BOLLWORM, *Helicoverpa armigera* (Hubner), (LEPIDOPTERA: NOCUTIDAE)

USDA-APHIS-PPQ-CPHST-PERAL

Section A



Scientific name: *Helicoverpa armigera* (L.)

Order: Lepidoptera

Family: Noctuidae

Common Name: Old world bollworm

Figure 1. *Helicoverpa armigera* eggs (a), larva (b) and adult (c) (Photos (a) by BASF, (b) and (c) by Curtin R./OPIE 1998).

Purpose:

The United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) has developed an Internet accessible list of plant pests (<http://www.aphis.usda.gov/ppq/regpestlist>). The purpose of the list is to provide trading partners an official USDA-APHIS list of Regulated Plant Pests of concern to the U.S., and to provide focus to APHIS' safeguarding activities including pre-clearance inspection at ports of entry, exotic pest surveys, and eradication activities. Periodically, recommendations are received that propose the addition of new plant pests to this list. This Pest Risk Assessment (PRA) was developed as part of the process for determining whether a plant pest should be added to the Regulated Plant Pest list. The PRA accomplishes this by evaluating the risk to American agriculture, managed and natural ecosystems, should the specified organism be introduced in the U.S. Likely pathways for introduction have been evaluated; however, they were not included in the final evaluation of this organism, since new and unforeseen pathways may develop overnight.

VENETTE ET AL., 2003

Mini Risk Assessment Old World bollworm, *Helicoverpa armigera* Hübner [Lepidoptera: Noctuidae]

Robert C. Venette, Erica E. Davis, Jennifer Zaspel, Holly Heisler, & Margaret Larson
Department of Entomology, University of Minnesota
St. Paul, MN 55108
September 28, 2003

Introduction

Helicoverpa armigera is a highly polyphagous pest of many economically significant crops in portions of Africa, Asia, Australia (including Oceania), and Europe (King 1994). The likelihood and consequences of establishment by *H. armigera* have been evaluated in pathway-initiated risk assessments and pest risk assessments. *Helicoverpa armigera* is considered highly likely of becoming established in the US if introduced; the consequences of its establishment for US agricultural and natural ecosystems are consistently rated high (i.e., severe) (Cave and Redlin 1996a, b, c, Lightfield 1997a, b, Ogden and Podleckis 2000, Fowler and Lakin 2001). Because of the number of crops that this pest affects, it has many common names: scarce bordered straw worm, corn earworm, African cotton bollworm, American bollworm, and tomato worm (Zhang 1994, Begemann and Schoeman 1999).

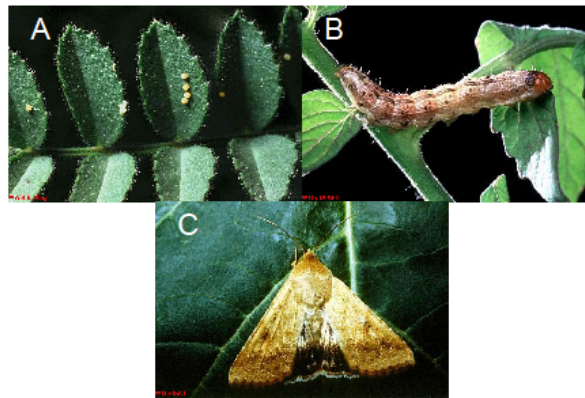
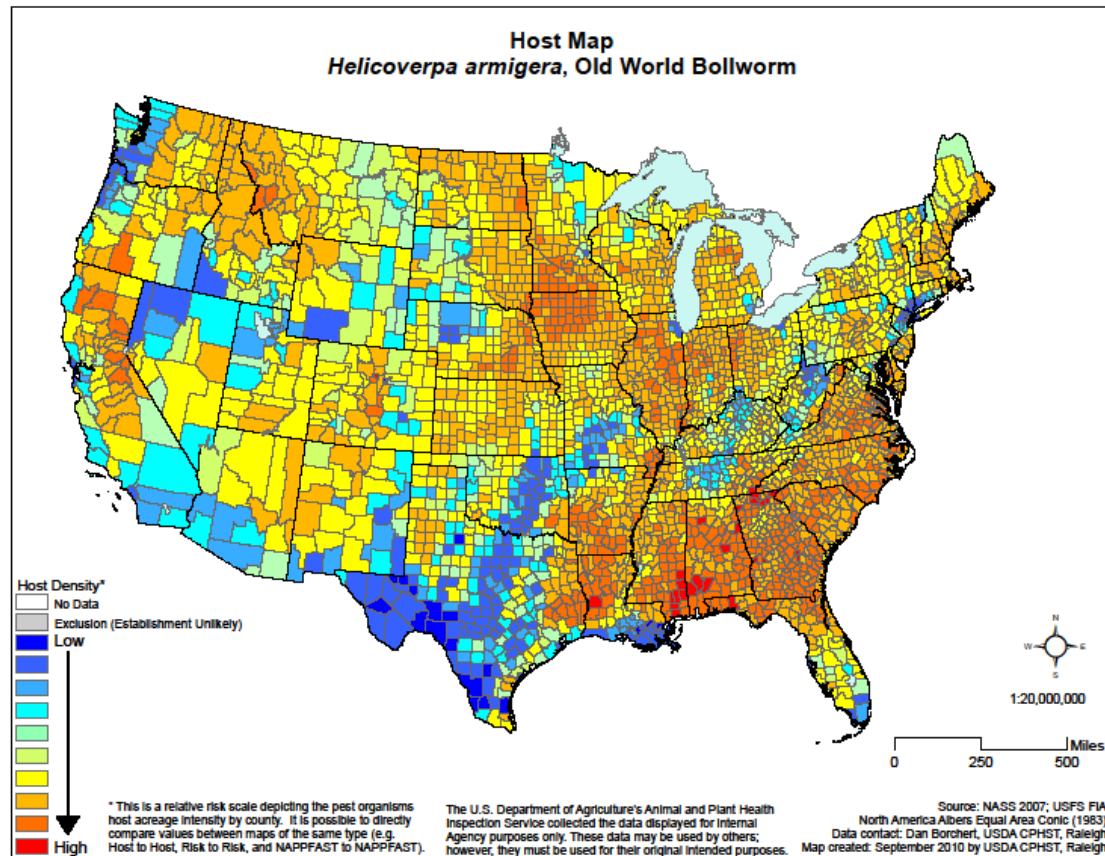
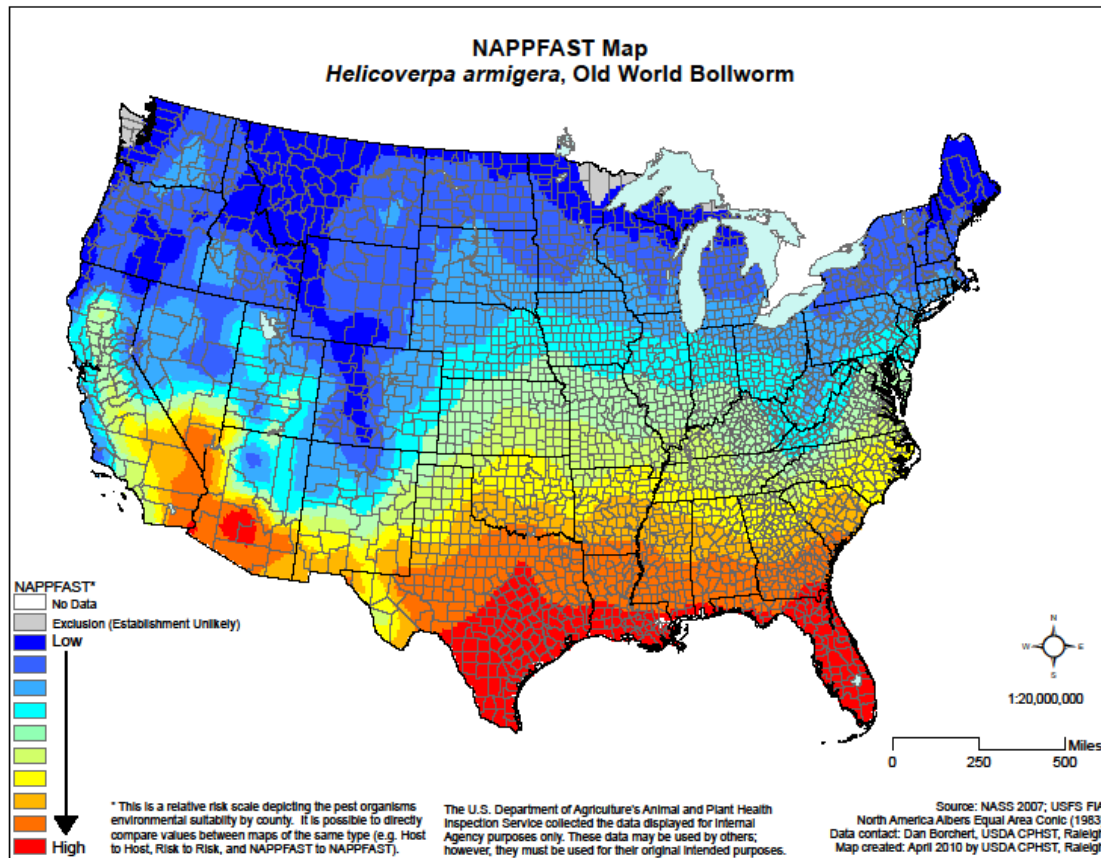


Figure 1. Life stages of *Helicoverpa armigera*, images not to scale: (A) eggs; (B) larva; and (C) adult. [Photos from (CAB 2003)].

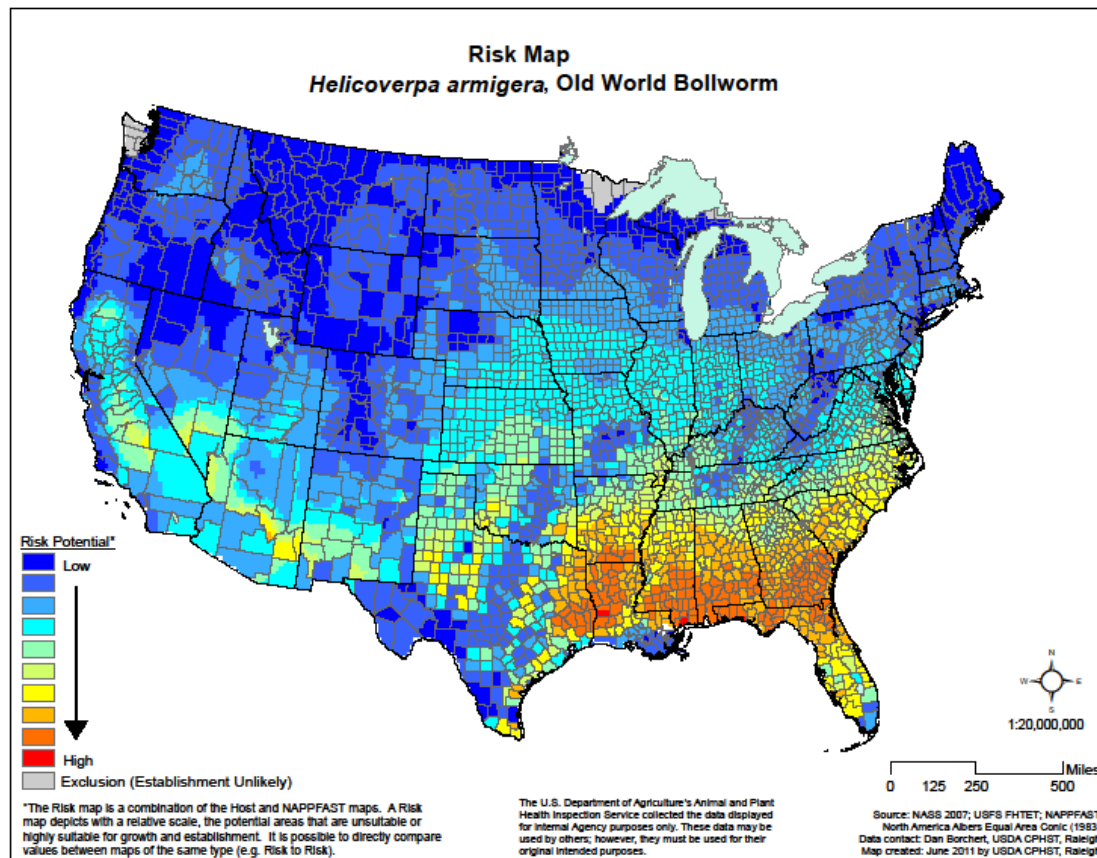
CAPS RISK MAPS- HOST



CAPS RISK MAPS- CLIMATE



CAPS RISK MAP- MULTIPLICATIVE



NEW PEST RESPONSE GUIDELINES-2014



United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Plant Protection
and Quarantine

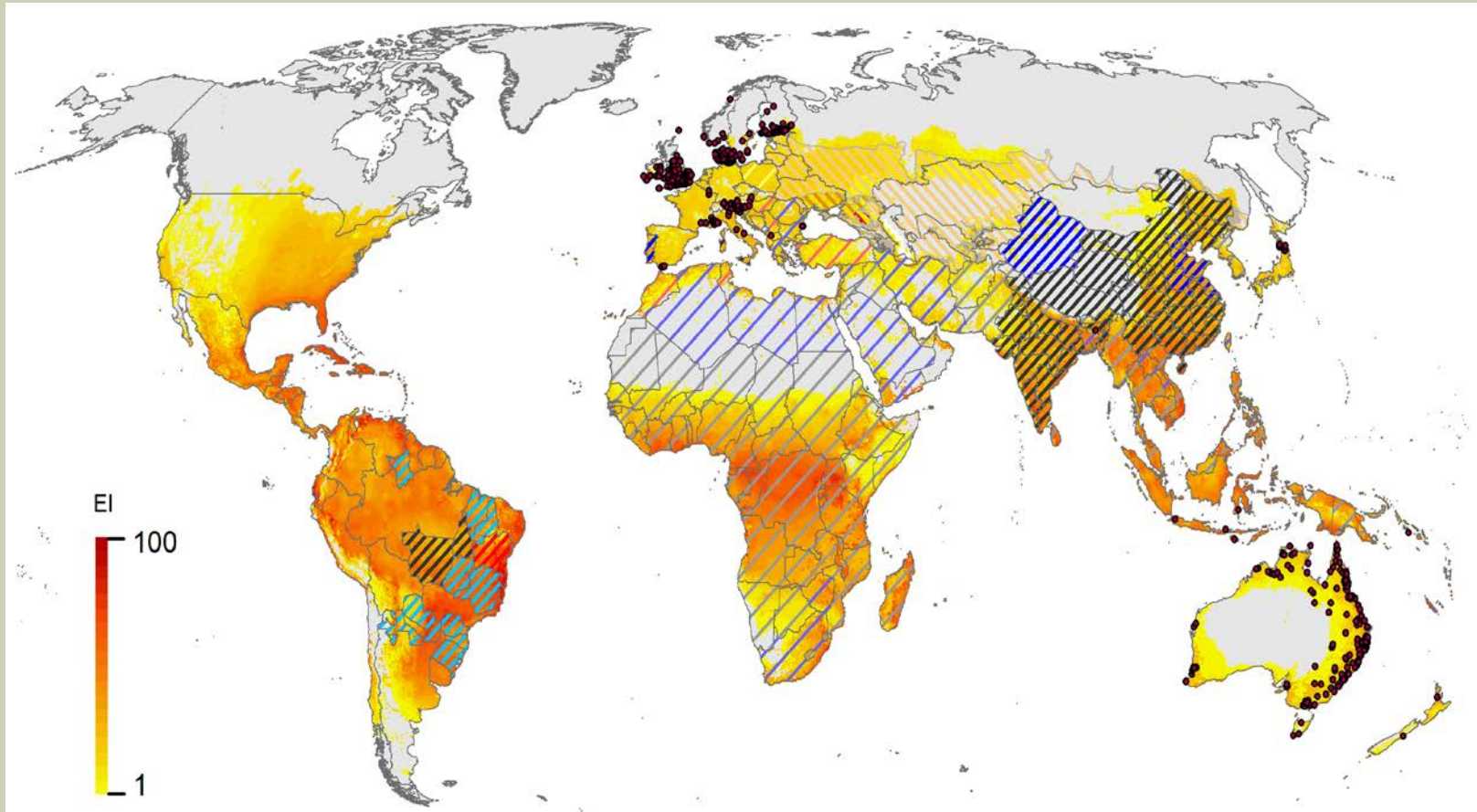
New Pest Response Guidelines

Helicoverpa armigera (Hübner)

Old World Bollworm

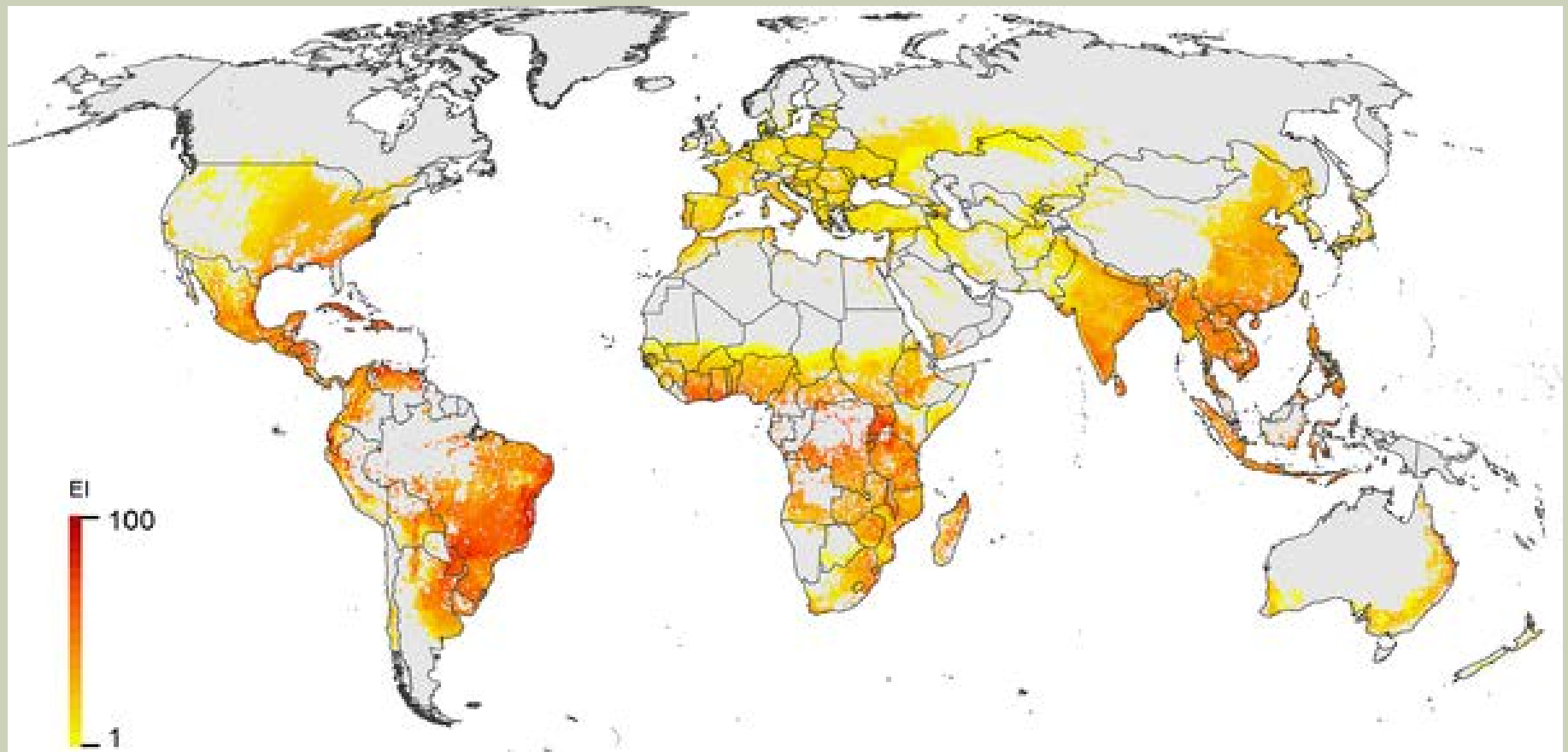


KRITICOS ET AL. 2015



Global climate suitability for establishment

Fig 3. Potential global distribution of *Helicoverpa armigera*, modelled using CLIMEX, taking into account climate suitability, irrigation patterns, and the existence of suitable crop hosts.

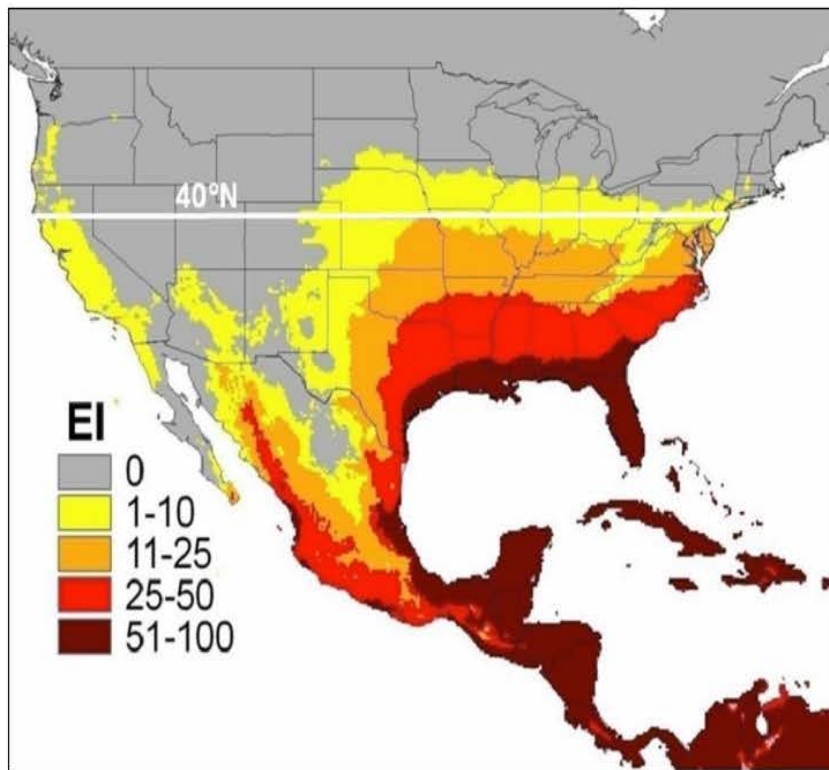


Kriticos DJ, Ota N, Hutchison WD, Beddow J, Walsh T, et al. (2015) The Potential Distribution of Invading *Helicoverpa armigera* in North America: Is It Just a Matter of Time?. PLoS ONE 10(3): e0119618. doi:10.1371/journal.pone.0119618

<http://127.0.0.1:8081/plosone/article?id=info:doi/10.1371/journal.pone.0119618>

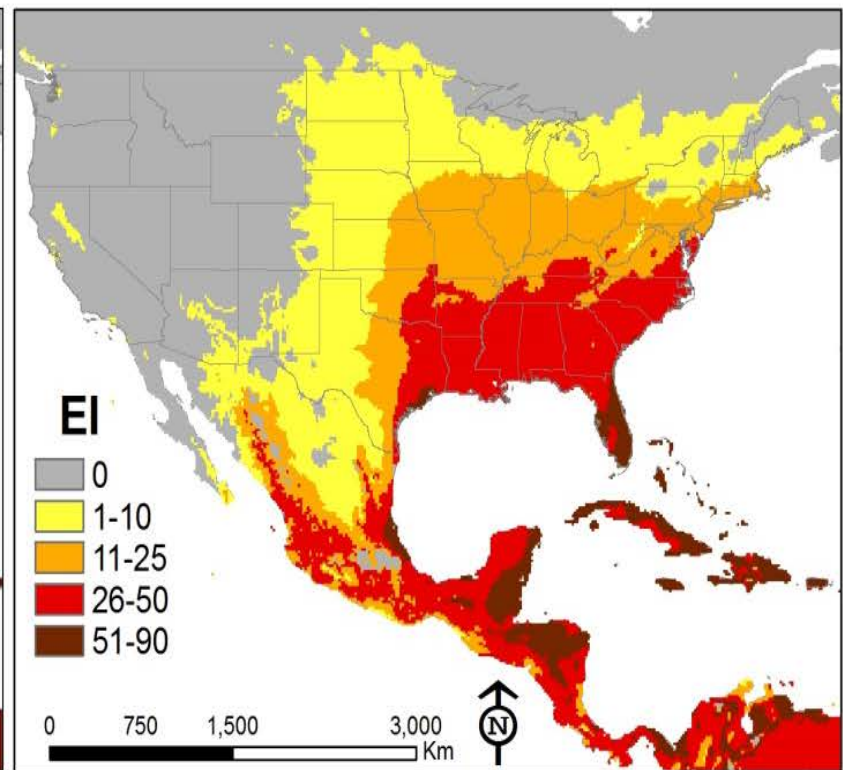
SIMILAR SPECIES

Corn earworm



Corn earworm eco-climatic index maps were created by Amy Morey. Morey, Amy Claire. Corn earworm (*Helicoverpa zea* Boddie), cold hardiness, and climate change: Implications for future distributions and IPM. Diss. UNIVERSITY OF MINNESOTA, 2010.

OWB

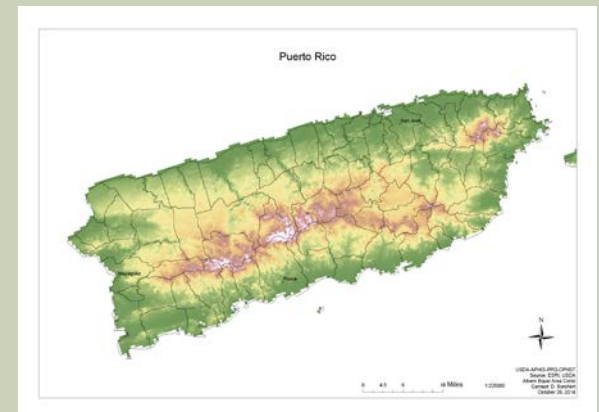
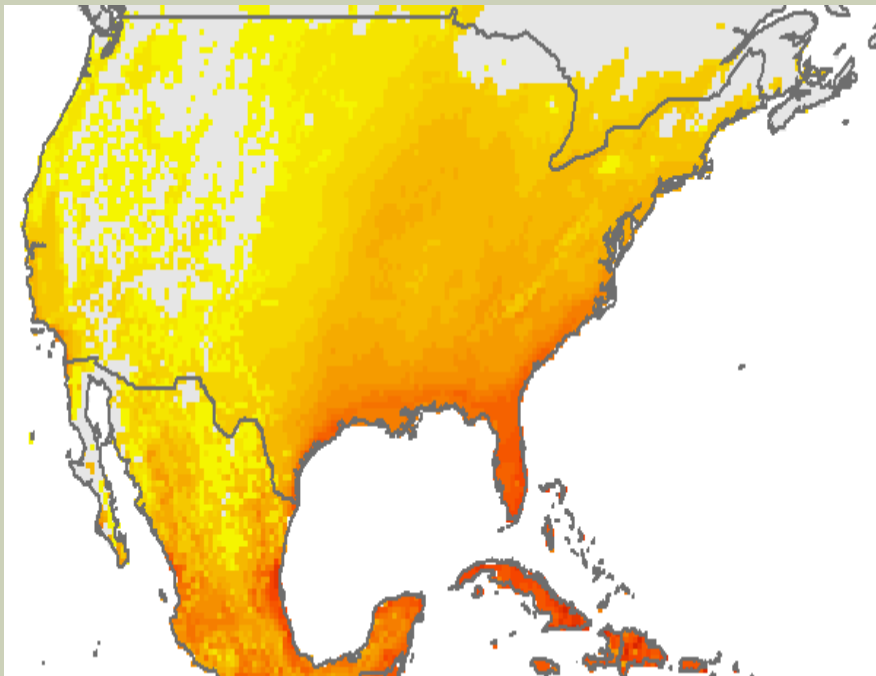


Map created by: Yu Takeuchi and Kevin Bigsby
USDA APHIS PPQ CPHST PERAL
NCSU CIPM
Projection: WGS 1984

Data Source: Kriticos et al.
Date: February 18, 2015

DECISION MAKING

The impact of focus Floodlight vs Spotlight



DECISION MAKING

- Perception
 - Long regarded as a pest of high concern
 - Why are we not ready for OWB?
 - Preparation
 - How does this differ if eradication is not likely
- Effective communication
 - Management to reduce impact is a different story than usual
- Good Partnerships
 - University, IPM centers, Industry
- Functional Leadership
 - Clearly defined roles and responsibilities

SUMMARY

- OWB is coming (or here)
- What will the impact be?
 - How will we know?
 - Where will impact be the greatest?
- Risk Products and Communication
 - Constantly evolving
 - Awareness and inclusion of similar species
- Decision Making
 - Wide and Narrow views necessary
 - Important to keep many plates turning at once