Water Conservation in the rio Grande and Colorado by Controlling Aquatic Weeds

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Instituto Mexicano de Tecnología del Agua

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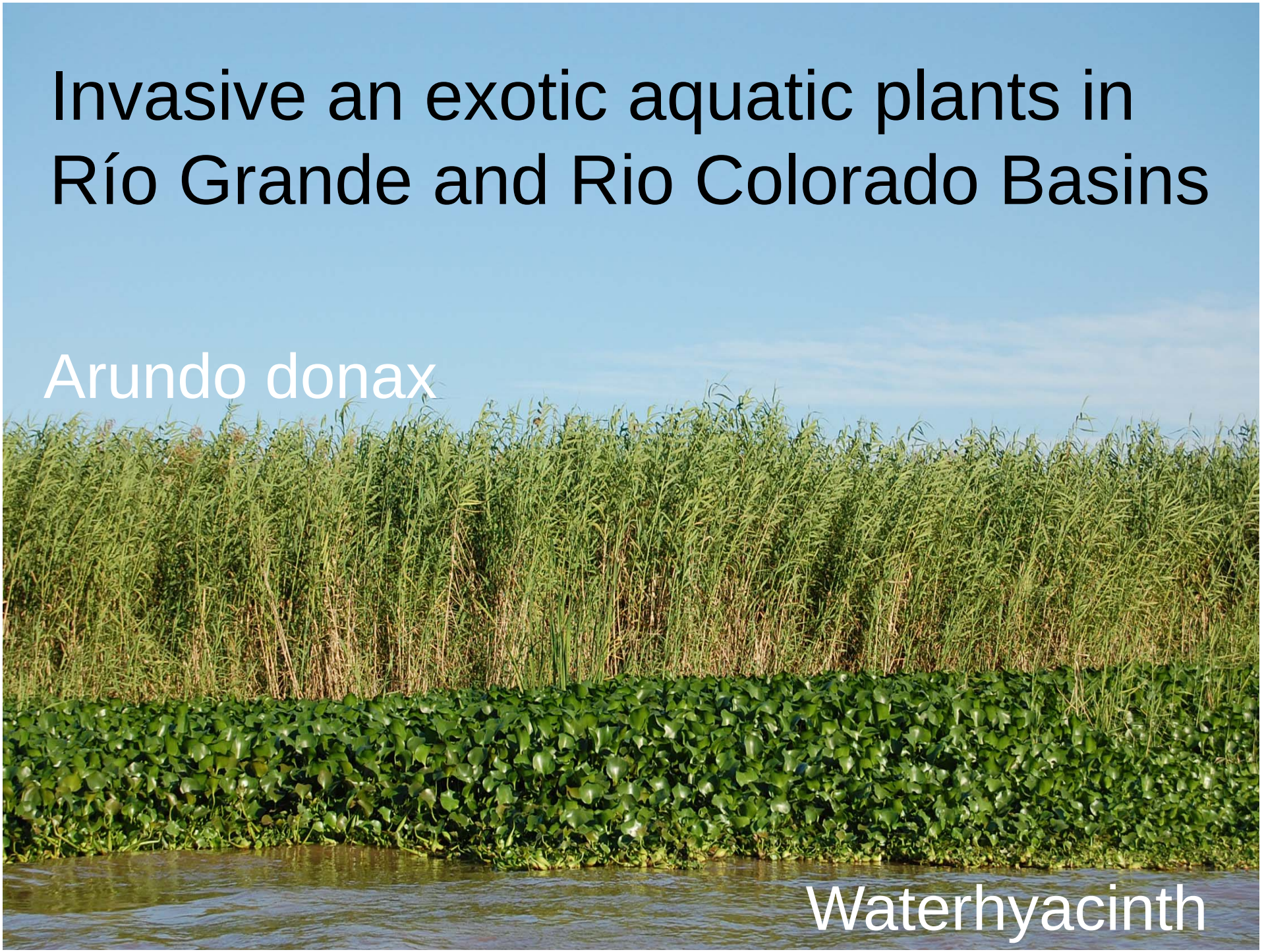
SEMARNAT

Invasive an exotic aquatic plants in Río Grande and Rio Colorado Basins



Arundo doxa/ Giant reed

Clonal spreads by rhizomes

Arundo was introduced from Spain

Declared noxious weed in USA and México

Water Conservation

- Reduce urban use for landscapes
- Industrial recycling of water
- Reduce irrigation losses – line canals
- Desalination
- **Aquatic weeds Control**

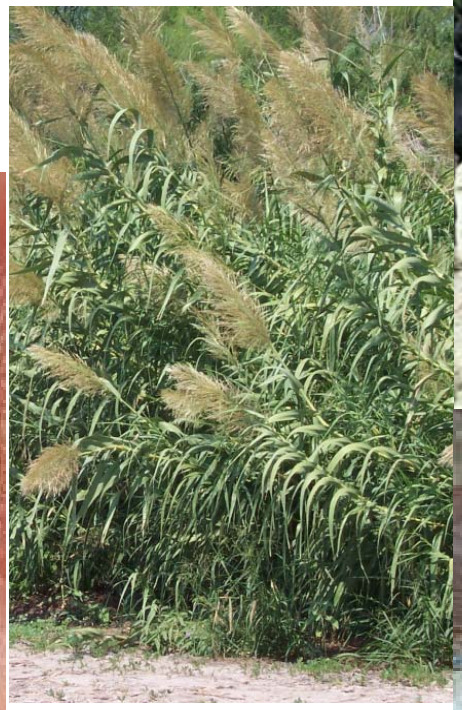
Arundo in Rio Grande (Laredo, Texas)

Modification of fire regime
12/04/2013

Animal Health

Infested cattle

Arundo donax



Cattle fever tick

Arundo enhances survival of tick

Infested deer

Habitat of mosquitoes
Aedes aegypt1=Dengue

Anopheles spp

Table 3. Percent classification and percent change of giant reed and associated surface types derived from supervised image analysis of color-infrared aerial photographs

from 2002 and ~~2008 of sites 2,3, and 4 along the Rio Grande near Del Rio~~, Texas.

Site/Cover Type	2002		2008		% Change
	Area		Area		
Site 2	%	ha	%	ha	
Giant reed	29.1	19.6	43.6	29.3	49.9
Soil	19.0	12.8	17.9	12.0	-6.0
Mixed herb.	27.8	18.7	17.8	12.0	-36.0
Woody plants	17.4	11.7	14.5	9.8	-16.4
Water	6.8	4.6	6.2	4.2	-7.9
Site 3					
Giant reed	45.8	67.4	47.2	69.6	3.2
Soil	17.7	26.0	9.9	14.5	-44.1
Mixed herb.	22.3	32.8	18.1	26.6	-18.8
Woody plants	8.0	11.8	14.6	21.5	81.6
Water	6.2	9.2	10.2	15.1	63.9
Site 4					
Giant reed	43.7	48.2	53.6	59.2	22.8
Soil	30.2	33.4	13.9	15.3	-54.1
Mixed herb.	18.9	20.9	25.0	27.6	32.3
Water	7.2	7.9	7.5	8.2	3.9

BINATIONAL MEETING, 2009
CILA/IBWC/USDA/IMTA

Biologicla Control Agents approved by the North American Plant Protection Organization

(Experts fron USA, Canada and México)

Animal and Plant Health Inspection Service

Plant Protection & Quarantine

United States Department of Agriculture
Animal and Plant Health Inspection Service
4700 River Road
Riverdale, MD 20737

Permit to Move Live Plant Pests, Noxious Weeds, and Soil

Interstate Movement

Regulated by 7 CFR 330

This permit was generated electronically via the ePermits system

PERMITTEE NAME:	Dr. John A. Goolsby	**PERMIT NUMBER:**	P526P-09-00905
ORGANIZATION:	USDA-ARS	**APPLICATION NUMBER:**	P526-080703-007
ADDRESS:	2413 East Highway 83 Weslaco, TX 78596	**FACILITY NUMBER:**	N/A
MAILING ADDRESS:	2413 East Highway 83 Weslaco, TX 78596	**HAND CARRY:**	Yes
		DATE ISSUED:	04/15/2009
PHONE:	(956) 373-3223		
FAX:	(956) 969-4888	**EXPIRES:**	**04/15/2012**
DESTINATION:	USDA-APHIS-PPQ-PDDML, 22675 Moorefield Road, Edinburg, TX 78541		
RELEASE:	TX		

Under the conditions specified, this permit authorizes the following:

Article Category: Invertebrate Pests - Insects

Regulated Article	Life Stage(s)	Intended Use	Shipment Origins	Originally Collected	Culture Designation
Tetramesa romana	Adult	Release - Biocontrol	TX	Originally Collected from Outside North America	

Permit Number P526P-09-00905

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE
Lena Soileau	04/15/2009

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to $250,000 (7 U.S.C.s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C.s 1001)

SERVICIO NACIONAL DE SANIDAD, INOCUIDAD Y CALIDAD AGROALIMENTARIA
DIRECCIÓN GENERAL DE SANIDAD VEGETAL
CENTRO NACIONAL DE REFERENCIA FITOSANITARIA
SUBDIRECCIÓN DE DIAGNÓSTICO FITOSANITARIO
DEPARTAMENTO DE ROEDORES AVES Y MALEZAS
B00.01.04.01.03

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

DRA. MARICELA MARTINEZ JIMENEZ
RESPONSABLE DEL AREA DE MALEZAS ACUATICAS
INSTITUTO MEXICANO DE TECNOLOGIA DEL AGUA
PASEO CUAUHNAHUAC 8532
PROGRESO, JIUTEPEC, MOR. 62550

México, D. F. 06 de Agosto de 2008

En atención a su similar RJE 01.04.-103 donde solicita la importación de los insectos *Tetramesa romana* y *Rhizaspidioutus donacis* para el control biológico de la maleza *Arundo donax* y con fundamento en el Acuerdo que establece la clasificación y codificación de mercancía cuya importación está sujeta a regulación por parte de la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación le comunico lo siguiente:

Le corresponde a esta Secretaría autorizar únicamente la importación de organismos utilizados en el control biológico de plagas agrícolas, por lo que, las especies que usted menciona no requieren autorización por parte de esta Secretaría para ser importadas.

Sin más por el momento, aprovecho la oportunidad para enviarle un cordial saludo.

ATENTAMENTE
SUFRAGIO EFECTIVO. NO REELECCIÓN
EL DIRECTOR DEL CENTRO NACIONAL DE REFERENCIA FITOSANITARIA
POR AUSENCIA DEL DIRECTOR Y CON FUNDAMENTO
EN LO PREVISTO POR EL ARTÍCULO 82 DEL REGLAMENTO
INTERIOR DE ESTA DEPENDENCIA DEL EJECUTIVO FEDERAL

ING. FRANCISCO RAMIREZ Y RAMIREZ

SAGARPA / SENASICA
Dirección General de Sanidad Vegetal
DESPACHADO
12 AGO. 2008
OFICIALIA DE PARTES
Guillermo Pérez Valenzuela No. 127
Del Carmen Coyoacán, 04100 México, D.F.

Ccp. Ing. Arturo Calderón Ruanova. Director General de Inspección Fitozoosanitaria. dgif.dir@senasica.sagarpa.gob.mx
Ccp. Ing. Francisco Ramírez y Ramírez.- Director del Centro Nacional de Referencia Fitosanitaria. cnr@senasica.sagarpa.gob.mx
Ccp. Ing. Ricardo Pérez Zubiri.- Subdirector de Diagnóstico Fitosanitario. pcnr@senasica.sagarpa.gob.mx

"2008, Año de la Educación Física y el Deporte"

N. C. T. 02766
FRR/JRP/c/ml

Tetramesa romana
USDA-ARS

Rhizaspidiotus donacis female under armour

Tetramesa romana, Arundo wasp

LAREDO

Mass Rearing – T7

Arundo donax biological control program

USDA-ARS/APHIS

Arundo donax – giant reed;
an invasive weed of the Rio Grande Basin
Rio Grande Basin
Origin of invasive Arundo
Pilot Study
Sensing
Water Use of Arundo
Biological Control of Arundo
immatures gall stems and side shoots
Release petition submitted
scale insects feed on roots and side shoots
Release petition submitted
fly larvae feed on young shoots
Larvae are leafminers causing defoliation
USDA

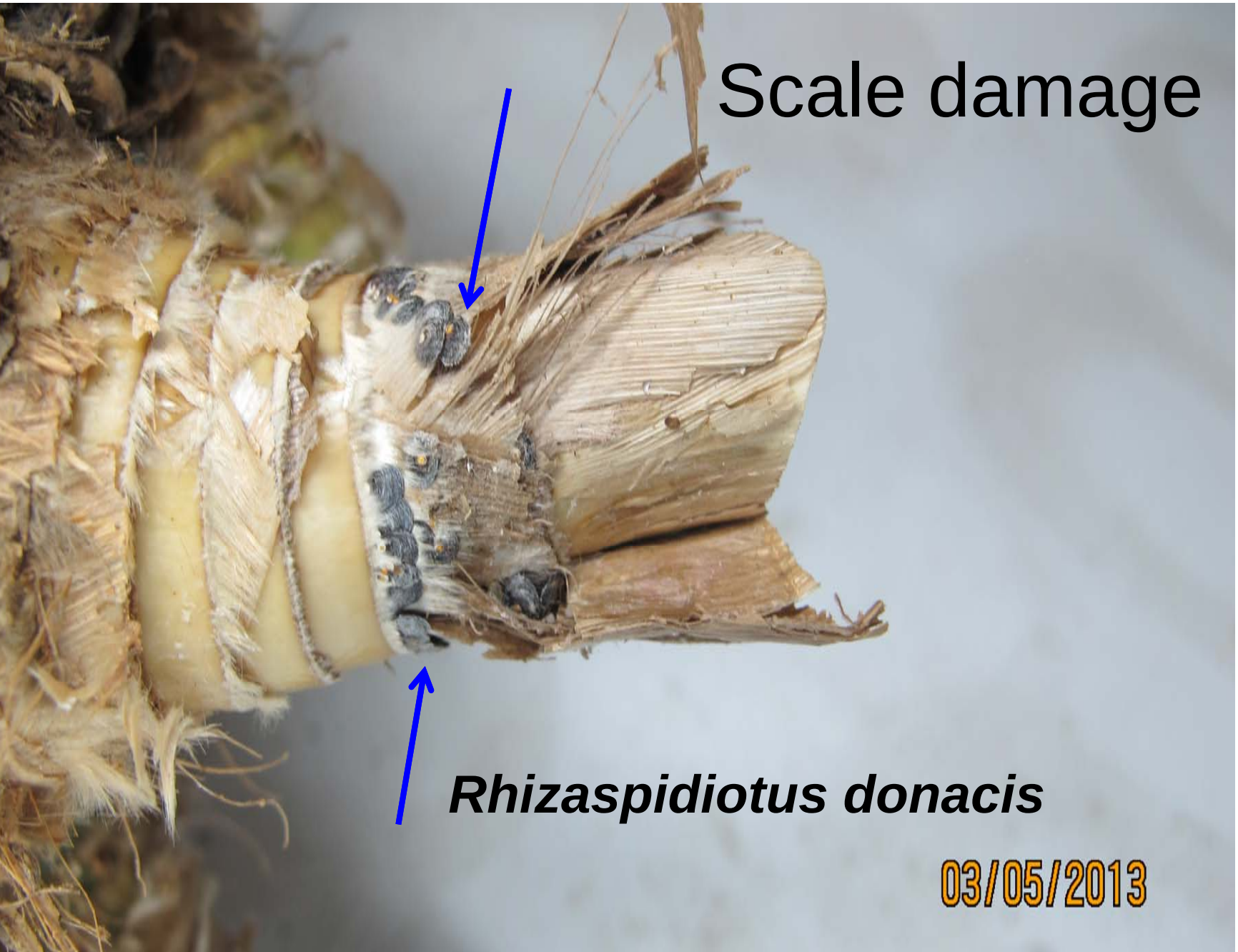
Tetramesa Release in México

18 8:38AM

Aerial release of arundo wasps

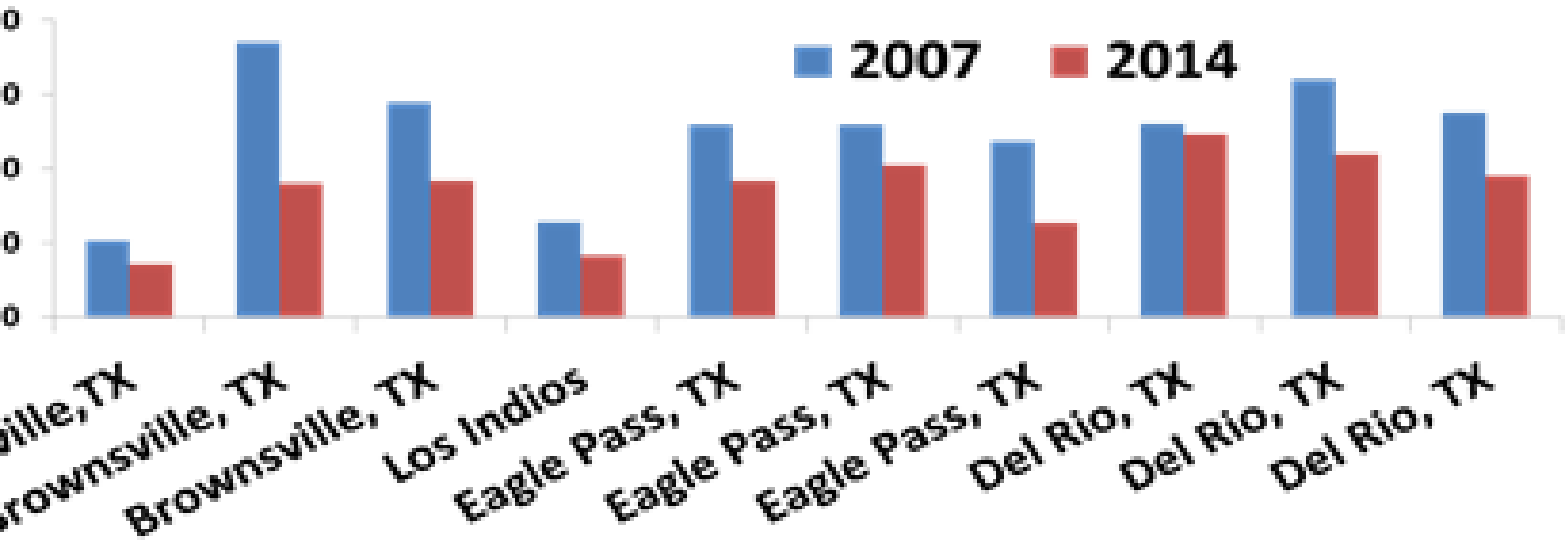
Aerial_Release_Cl

p Impacts on Growth


Scale damage
Rhizaspidiotus donacis
03/05/2013

09/04/2013

ct of the biological control program on *Arundo donax* biomass



- 22 % reduction in *A. donax* biomass between Del Rio and Brownsville
- 2.5 million tons of *A. donax* removed
- 6000 acre ft of irrigation water conserved per year
- Visibility into stands from 2m to 12m
- Ecological transition back to native vegetation beginning

. Goolsby, Patrick J. Moran, Alexis E. Racelis, Kenneth R. Sumny, Maricela Martinez Jimenez, Ronald D. Lacewell, Adalberto de Leon, & Alan A. Kirk 2015. Impact of the biological control agent, *Tetramesa romana* (Hymenoptera: Eurytomidae) on

Implications

- Positive Benefit-Cost Ratios
- Sustainable control
- No effect in the environment

Summary

ater conservation by controlling Invasive Species
the rio Bravo and Colorado, is an important
oject to being considered in Frontera 2020
ogram

exico and USA have a binational program and
uld like to be included in this Collaborative
greement

ological Control is a key component in an

Maricela Martínez Jiménez PhD

(Instituto Méxicano de Tecnología del Agua)

John Goolsby PhD

United State Department of Agriculture/ARS)