

Increasing ITP's production efficiency and product quality and value through APHIS agreements

Terrence Walters, ITP Coordinator

Identification Technology Program (ITP)

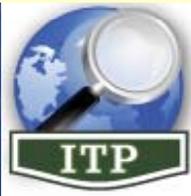
Fort Collins Laboratory (FCL)

Center for Plant Health Science and Technology (CPHST)

Plant Protection and Quarantine (PPQ)

Animal and Plant Health Inspection Service (APHIS)

United States Department of Agriculture (USDA)



CPHST



USDA

Annual USDA APHIS Agreement Meeting (Riverdale, MD): May 24, 2012

USDA APHIS PPQ CPHST Fort Collins Laboratory (FCL), Colorado

Programs associated with the CPHST FCL

1. Geospatial Technology
2. Pest Detection & Survey
3. Weed & Insect Control
4. Rearing & Diet Development
5. Waste Disposal & Decontamination
6. Identification Technology Program (ITP)



CPHST's Identification Technology Program (ITP)

ITP's Objective

ITP strives to address new identification challenges and embrace advanced technologies to maximize identification capabilities by PPQ and its partners

ITP's Purpose

To deliver innovative, scientifically-valid, digital, diagnostic resources to agencies concerned with and responsible for species posing risks and potential risks to U.S. agriculture, natural resources, and trading partners

ITP Coordinator



ITP Tool Developer



ITP Resource Developer

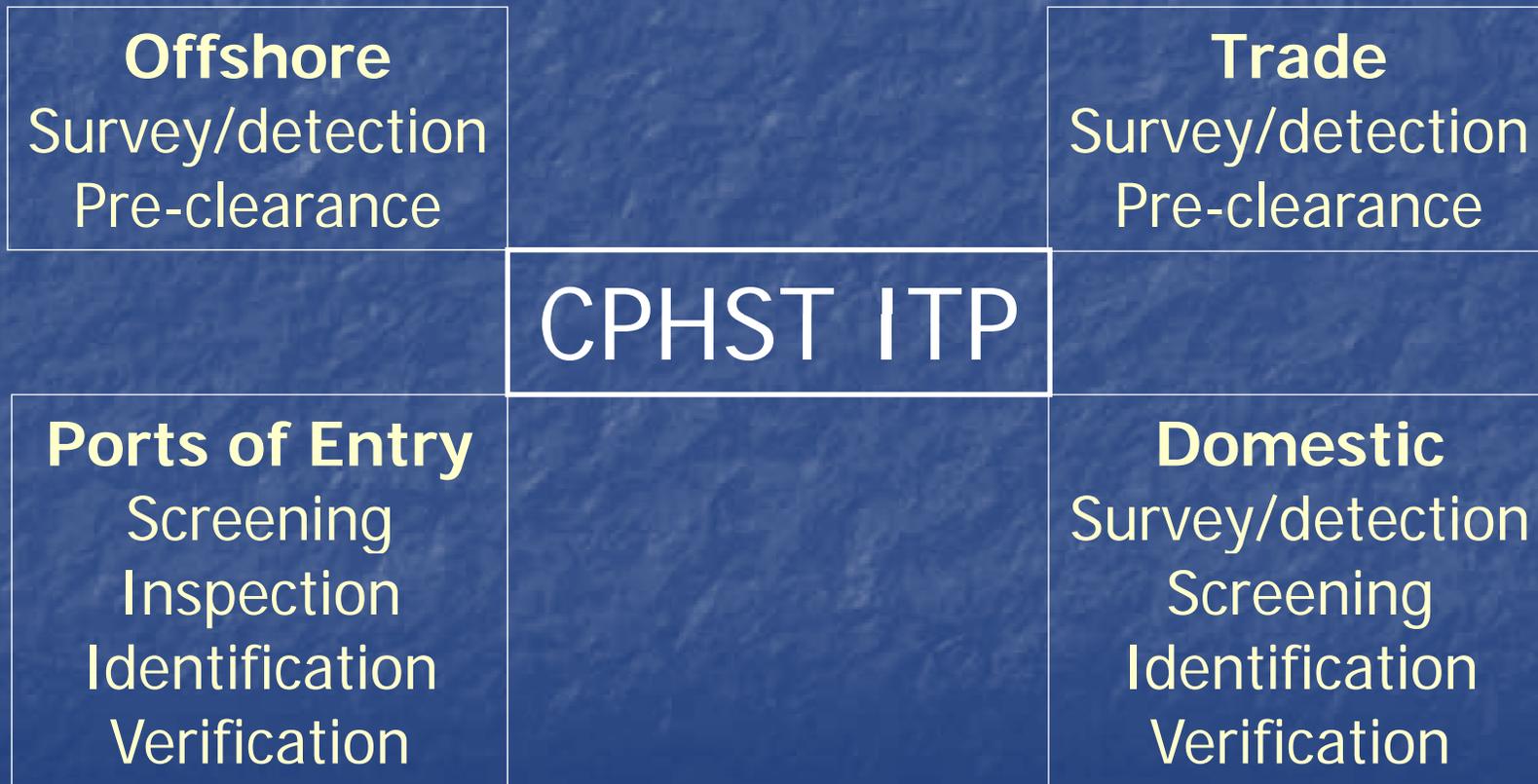


ITP Technician/Photographer



Identification Technology Program (ITP)

- ITP provides identification support to a broad and diverse clientele base offshore, at our ports, domestically, and those associated with trade
- ITP's clients have different levels of identification responsibilities associated with their position



Diversity in ITP's Clientele Base

Diversity in educational background

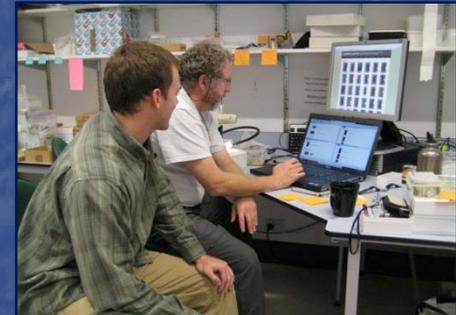
- Undergraduate student
- Undergraduate degree
- Graduate degree

Diversity in work/training experience related to identification

- No experience
- Seasonal experience
- Many years of experience (on the job training)
- Experience in other pest groups (new assignment)
- Expert in a pest group based on training and experience

Multi-generational diversity (impacts tool design)

- Traditionalists (66+ years old)
- Boomers (47-65)
- Generation X (31-46)
- Millennials (21-30)



ITP Program Areas

The ITP Team has four program areas. Each program area includes annual, multi-year, and ongoing projects in support of ITP's purpose

- ID Image
- ID Mobile
- ID Resource
- ID Tool

Program Areas	Program Area Objective
<p data-bbox="352 727 527 768">ID Image</p> 	<p data-bbox="730 764 1871 870">Provide scientifically-useful, digital images to enhance and expedite identification responsibilities</p>
<p data-bbox="352 1008 527 1049">ID Mobile</p> 	<p data-bbox="730 1097 1892 1203">Provide digital tools and aids, specifically designed and developed to access mobile device features</p>

ITP Program Areas

The ITP Team has four program areas. Each program area includes annual, multi-year, and ongoing projects in support of ITP's purpose

- ID Image
- ID Resource
- ID Mobile
- ID Tool

Program Areas	Program Area Objective
<p data-bbox="289 699 527 740">ID Resource</p> 	<p data-bbox="680 797 1919 846">Provide access to globally-produced identification products</p>
<p data-bbox="338 1003 478 1044">ID Tool</p> 	<p data-bbox="680 1105 1927 1268">Provide digital identification tools that enhance and make more efficient our clients' identification responsibilities</p> 

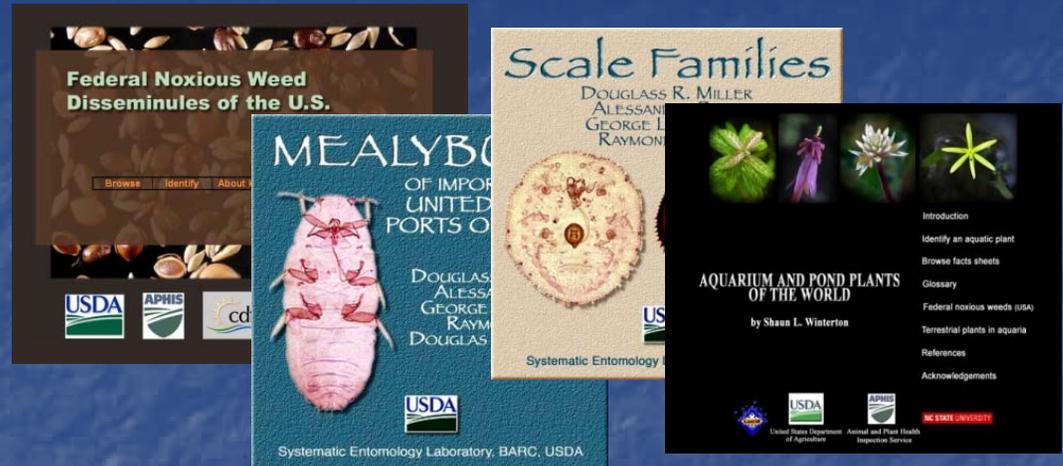
ITP's ID Tool: the Evolution of a Tool

Tool Content for original tools

- Matrix-based interactive key
- Support pages (static)
- Species fact sheets (static)

Clients: PPQ identifiers

Tool developers: scientists



Federal Noxious Weed Disseminules of the U.S.

Home Disseminule Types Key to Keys Poaceae Key Fabaceae Key Other Families Key Fact Sheets About Tool Glossary

Key to Keys

If your unknown disseminule is a seed or fruit, use this **Key to Keys** to determine which of the three angiosperm family keys — **Poaceae**, **Fabaceae**, **Other Families** — to use for taxon identification.

You should use the Poaceae Key if —

- The disseminule is a fruit (called a caryopsis) sheathed by 2+ bracts occurring at alternating vertical positions along the floral axis and opposing each other as they sheath the caryopsis. Bract sheathing is evidenced by the occurrence of the (1 or 2) longitudinal edge(s) of the outermost bract. The grass disseminule is sometimes "branched" and these single or multiple branches may be subtended by accessory structures such as a whorl of hairs or bristles.

Look at typical versus atypical types of FNW bracted grass disseminules.

Support page

Key: Features: Edges: View: Options: Help

1 Features: Appl size: 16

Seed - pleurogram

Seed - umbo

Seed - lens

Fruit - length: length in cm

2 Features: Appl size: 2

Seed - pleurogram

wide relative to...

3 Features: Appl size: 16

Edges: Preliminary: 10

Mimosa pigra

Prosopea castellaniana

Prosopea farcta

4 Features: Appl size: 16

Edges: Finalized: 18

Calyptra officinalis

Prosopea albaturo

Prosopea argentea

Trees Lists Images

Matrix-based interactive key

Aquarium and Pond Plants of the World

Introduction Glossary Terrestrial plants in aquaria

Bacopa Aublet.

MADEA

Common name: Water hyssop. Herb of grace. Brahmi

Family: Scrophulariaceae

Could be confused with: *Lindernia*, *Lysimachia*, *Micropladium*, *Myriophyllum* (rarely), *Etolida*, *Mayaca*

Native distribution: Tropical and subtropical regions of world, particularly America.

Species commonly cultivated: *B. caroliniana* (Walter) Robinson (North America) (= *B. ampliolepis* (L.) Pennell (Pan-tropical)), *B. monnina* (L.) Pennell (Pan-tropical), *B. longiera* (Chamisso & Schlegel) Wettstein (Brazil), *B. myriophylloides* (Benth.) Wettstein (Brazil)

Adventive distribution: unknown.

Weed status: Native species of *Bacopa* (*B. rotundifolia* (L.) Wettst., *B. monnina* and *B. essent* (Nees) Pennell) are known to be weeds in rice crops in the USA.

Habit: Terrestrial, amphibious or obligately aquatic; stem plant

Brief description: Annual or perennial, decumbent or erect stem plant. Leaves opposite or whorled, sessile. Leaf blade regular, round to linear, venation palmate or pinnate. Stems hairy or smooth. Flowers produced solitary or in pairs from leaf axils, usually radially symmetrical; sepals 5, petals 5, usually white, blue or purple in color. Dispersal and propagation by seeds and stem fragments.

Natural habitat: Often found as an amphibious littoral inhabitant of streams, lakes and wetlands.

Additional comments: This genus contains 70-100 species, most of which are terrestrial or amphibious; several species (e.g. *B. myriophylloides*) are obligately aquatic. Only four species are

Fact sheet

ITP's ID Tool: the Evolution of a Tool

ITP's 2010-2013 Objectives

- a) Increase the team's efficiency, effectiveness, and productivity for all stages of identification tool production*
- b) Increase product value and usefulness to clients, as well as increasing the number of users for ITP's products

ITP's Goals to Meet Objectives (9 goals)

1. Reduce ITP's costs while increasing the quality and value of the product
2. Increase number of tools delivered each year by ITP to meet increasing demand
3. Increase opportunities to use available images, illustrations, design templates, etc. to support ongoing client requests for new ways to present, navigate, and use content, images, keys, etc.
4. Provide ITP's clients with immediate access to all updates to a tool

* Stages in the life of an ITP identification tool

- *creation stages*: design, development, deployment, and delivery
- *maintain stages*: usage analytics, updates /edits, and, if required, new edition (back to creation)

ITP's ID Tool: the Evolution of a Tool

5. Do not duplicate a photograph, illustration, and/or content file when using it for another purpose within the site (e.g., image)
6. Reduce editing and updating time for tools by editing tool elements once even though they may be found in multiple places within site (e.g., image caption)
7. Provide ITP's clients with text search capabilities within the web site and filtering capabilities for image galleries – highly requested by clients
8. Increase the diversity of ITP's clientele base by delivering tools designed to meet specific identification responsibilities
9. Design tools that that can be re-used to support tablet/smart phone features

ITP's Screening Aids (2008-2011)

About Key to Adults Key to Larvae Fact Sheets Glossary Acknowledgements

Pink Bollworm and its Look-Alikes

Garrett B. Hughes and Wendy Moore



A Resource for Pests and Diseases of Cultivated Palms

SCREENING AID TO PESTS

HOME KEYS FACT SHEETS GLOSSARY ABOUT INSECT ANATOMY

Moths and butterflies

Moths and butterflies can range widely in size, with wingspans ranging from about 1 cm to more than 10 cm. Many are brightly colored and are easily identified by their antennae, body, and their flight patterns. They have an elongated, tube-like mouthpart, known as a proboscis.

FACT SHEET
FACT SHEET



About This Tool

The pages of this tool offer a variety of resources to aid the user in the identification of arthropod palm pests.

Taxa Covered

This tool includes arthropod pests of palms from the U.S. and the Caribbean.

Palm Resource

Learn more about the commodity-based resource *A Resource for Pests and Diseases of Cultivated Palms*.

About

LBAM ID

Tools for diagnosing light brown apple moth and related western U.S. leafrollers (Tortricidae: Archipini)



Todd M. Gilligan
Marc F. Epstein

USDA APHIS Colorado State University cdfa

Keys developed by Ludd D.A. Last modified 24 March 2009.

GO TO THE KEYS

Cooperative Agreement (CA) with Colorado State University

Department of Computer Information Systems in the College of Business
(Purpose: *Blending technology communication to break through business barriers*)

- CA Phase #1 of a suite of three CAs (3 years) to support ITP's Goals
- CA Principal Investigator (PI): Dr. Jon Clark, Director of the College of Business
- CA ADODR: Dr. Terrence Walters, USDA APHIS PPQ CPHST FCL ITP
- CA Time Frame: Sept. 27, 2010 to Aug. 22, 2011
- CA Budget: Funds for a graduate student already with web design expertise and undertaking a graduate degree in the department with a focus on web databases and web development

ITP's Commodity-based Resources (2010-2011)



Citrus Resource

HOME HOME2 ABOUT CITRUS ABOUT THE RESOURCE GALLERY LINKS

CITRUS ID CITRUS DISEASES CITRUS PESTS

Citrus ID
Citrus ID offers identification support for over 200 cultivars and varieties of citrus. [More information](#) [View site](#)

About Citrus
There are perhaps just three true varieties of citrus: *C. aurantium* (orange), *C. limonum* (lemon), and *C. reticulatum* (mandarin). All other citrus breeds today are hybrids.

About the Resource
Citrus resources were created to provide an easy-to-use resource for citrus growers and others interested in citrus and citrus identification needs.

View the Galleries
Citrus resources include a comprehensive image gallery with theme galleries, and cultivated palms. [Click here to learn more.](#)

Can I just view images and facts sheets?
Find links to image galleries and fact sheets from all currently available tools.

What's new in the resource?
The site updates have included...



A Resource for Pests and Diseases of Cultivated Palms

HOME ABOUT PALMS ABOUT RESOURCE REFERENCES SITE'S TOOL TERMINOLOGY GALLERY

Palm ID Screening Aid Symptoms Rootless Scabies Mites

Identifying Commonly Cultivated Palms
Identify cultivated palms, whether you have the entire plant or just a part of the plant. [more information](#) [view site](#)

Which tool should I use?
This resource offers a variety of tools to help with the identification of common pests, diseases, disorders, and cultivated palms. [Click here to learn more.](#)

ABOUT THIS PALM RESOURCE
Palms are an important commodity. Palms are a source of food, oil, cork, fiber, medicine, hats, mats, tennis rackets, beverages, furniture, and medicine. These resources of palms are featured in cooperation with the Department of Plant, Soil, and Environmental Science, University of California, Riverside (UCR), and Phoenix, Arizona (ASU). In addition to the many other products...

Can I just view images and fact sheets?
Find links to image galleries and fact sheets from all currently available tools.

What's new in the resource?
The site updates have included...



A Resource For California Central Valley Table Grapes

HOME ABOUT RESOURCE ABOUT TABLE GRAPES SELECT TOOL

About This Resource
The table grape resource provides you with a portal to various electronic identification tools to support the screening of pests, diseases, and weeds that might be associated with the selected table grapes from California's Central Valley.

The tools within this resource are designed to enhance, and make more efficient, the process for early detection of regulated pests, diseases, and weed species when exporting the commodity.

[Learn more](#) [View site](#)

Cooperative Agreement with Colorado State University

CA Purpose: to create two PHP¹, MySQL², data-driven web sites specifically designed for future ITP web site development

CA Goal: structure a database and PHP code in an object-oriented manner so that future ITP identification tools can easily be added by a web developer utilizing the database and the core PHP classes

CA Deliverables: Produce two identification tool web sites, terrestrial molluscs (snails and slugs) and dried botanicals (potpourri), using PHP scripting language and a MySQL database

¹ **PHP** ("*PHP: Hypertext Preprocessor*") is a widely-used Open Source general-purpose scripting language especially suited for web development. The main goal of the language is to allow web developers to write dynamically generated web pages quickly.

² **MySQL** one of the world's most popular Open Source database programs because of its high performance, high reliability, and ease of use. Many of the world's largest and fastest-growing organizations (e.g., Facebook, Google, Adobe, Lucent) rely on MySQL to save time and money powering their high-volume web sites.

Cooperative Agreement with Colorado State University

CSU's 10-8100-1557-CA

- Submitted work plan and associated documents on August 5, 2010
- CA approved on August 27, 2010
- CA began on Sept. 27, 2010; CA ended on August 22, 2011

Calendar Quarter	Progress reports submitted to CPHST	SF425s submitted to CPHST	SF270s submitted to CPHST
1QA: 09/27/10 to 12/31/10	1/3/2011	1/11/2011	#01 11/10/2010 #02 12/09/2010 #03 01/11/2011
2QA: 01/01/11 to 03/31/11	4/29/2011	4/18/2011	#04 02/08/2011 #05 03/07/2011 #06 04/18/2011
3QA: 04/01/11 to 06/30/11	7/27/2011	7/20/2011	#07 05/12/2011 #08 06/11/2011 #09 07/20/2011
4QA: 07/01/11 to 08/22/11	10/29/2011 (Final)	11/10/2011 (Final)	#10 08/06/2011 #11 11/10/2011 (Final)

Cooperative Agreement with Colorado State University

CA Milestone (1 of 12): offer ITP's clients the option of a server-side key and a java applet key within each identification tool

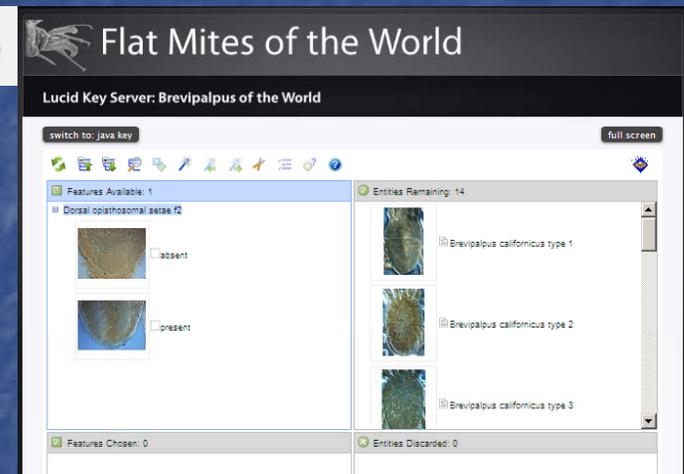
Option 1: Server-side key

Advantages:

- Fully web-based
- Requires no special software or add-ons
- You do not have to wait for entire key to load
- It can be used on mobile devices

Disadvantages:

- Users experience latency between character selections



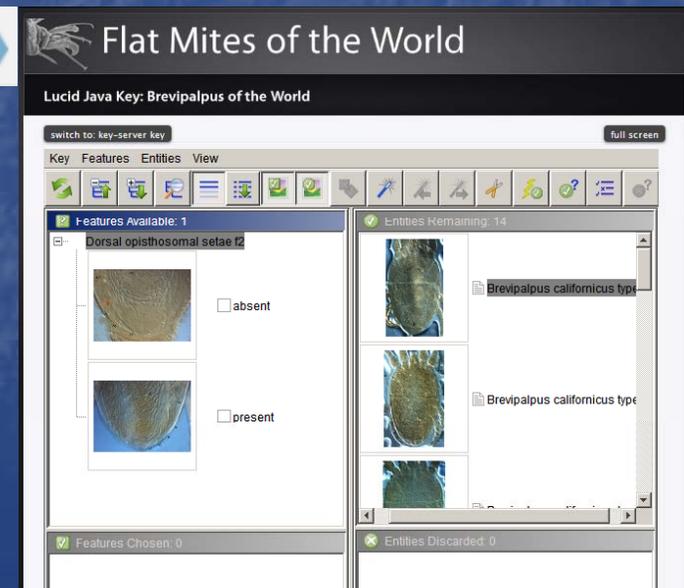
Option 2: Java applet key

Advantages:

- The key is pre-loaded, eliminating latency between character selections

Disadvantages:

- Entire key must be loaded before it can be used
- System requirements are more restrictive
- Java applets may be blocked as active content
- Java applet will not run on many mobile devices



Cooperative Agreement with Colorado State University

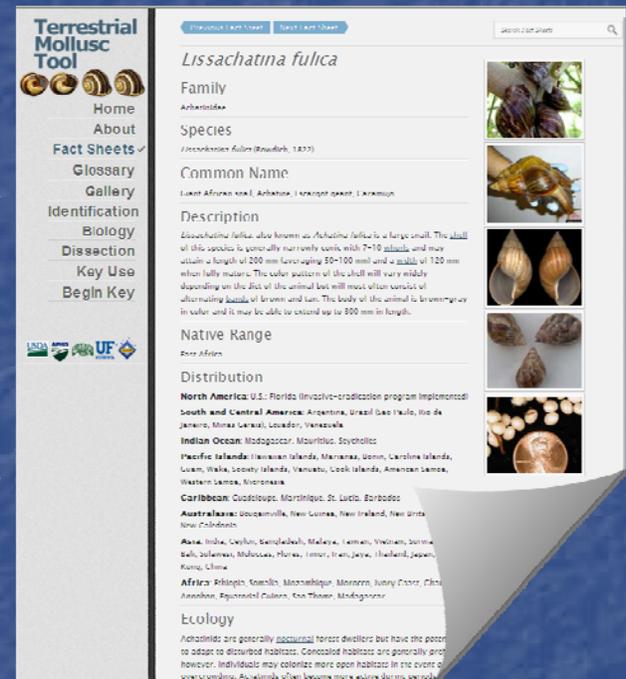
CA Milestone: develop a MySQL single relational database for all future ITP identification tools

- A relational database is essentially a group of tables
- Tables are made up of columns and rows
- Relational databases are queried using SQL. Results are produced from queries that access data from one or more tables within the database



Client Request

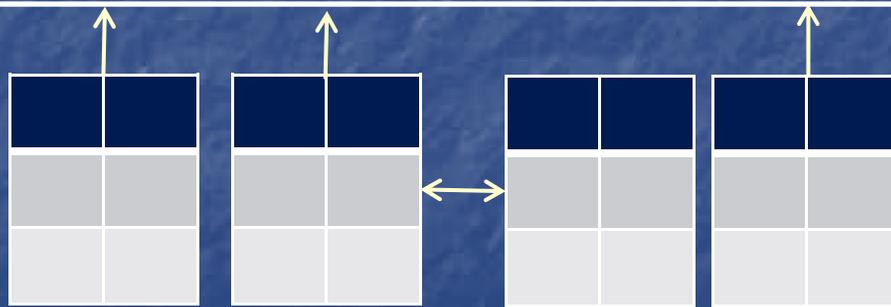
Client Receives



Dynamically generated fact sheet for Giant African Snail

Client requests a fact sheet for Giant African Snail (*Lissachatina fulica*) from tool web site

Behind the scenes



Fact Sheet Template Table

Fact Sheet Content Table

Glossary Master Table

Image Table

Cooperative Agreement with Colorado State University

2011 – ITP delivers first relational database identification tool to our clients in July 2011

Terrestrial Mollusc Tool*

- Clients: designed for non expert
- Option for server-side key & Java applet key
- Dynamically generated support pages
- Dynamically generated species fact sheets
- Fact sheet text linked to glossary terms
- Dynamically generated image gallery
- ITP's first dissection modules
- Text search capabilities for site

* Content: Ph.D. Dissertation project (ITP CA w/ UF)

3 illustrated dissection modules

Snail and Slug Dissection

Getting Started Snail Slug Slug: Veronicellidae

How to prepare the animal for dissection

Live specimens should be drowned in an airtight container that is completely filled with water. The animal should be left until completely drowned (i.e., unresponsive to touch). This will make it easier to dissect the specimen, as it kills the animal in an extended state (not contracted). Small snails may also be euthanized by emersion in boiling water. Specimens usually expire in a relaxed state and should be removed from boiling water when no longer responsive to touch.

The specimen should then be transferred to a dissecting dish containing 70% ethanol or water. The solution should completely cover the specimen to minimize dehydration of the tissues. The dissecting dish should then be mounted onto the stage of the microscope and the dissection conducted under at least 10 X magnification.

Fact sheets text linked to glossary

Dynamic image gallery

Cooperative Agreement with Colorado State University

Terrestrial Mollusc Tool

Home
About
Fact Sheets
Glossary
Gallery
Identification
Biology
Dissection
Key Use
Begin Key

Biology and Ecology

Biology
Ecology
Juvenile--Adult
Reproduction
Cross-fertilization

Introduction to Terrestrial Mollusc Tool

The Terrestrial Mollusc Tool was specifically designed to assist in the identification of adult terrestrial slugs and snails of agricultural importance. The tool also includes species of quarantine significance as well as invasive and contaminant mollusc species commonly intercepted at U.S. ports of entry. This Lucid-based identification tool specifically targets federal, state and other agencies or organizations within the U.S. that are concerned with the detection and identification

Snail and Slug Dissection

Getting Started | Snail | Slug | Slug: Varonicellidae

How to prepare the animal for dissection

Supplies:

- Dissecting microscope
- Water
- Dissecting dish
- Forceps
- Scalpel
- Dissecting scissors
- Pliers

List Of Fact Sheets

a b c d e g h l m o p r s t u v x z

a

- Achatina achatina
- Allopeas gracile
- Amphibulima p
- Archachatina m
- Arianta arbusto
- Ariolimax color
- Arion ater grou

Glossary of Terms

a

Aestivation (to aestivate): Being in a state of arrest (often temporary and can be broken at anytime).

Anal pore: Small opening located in the mantle; may be located anteriorly or posteriorly and is responsible for waste removal by the animal.

Annulated: Consisting of rings.

Anterior: Directional term: located in front. Nearer the head or front end of a shell.

Anterior-laterally: This is a directional term meaning towards the front, on the side.

1 2 3 4 Next Search Fact Sheets

Arion ater group: Arion rufus

Image gallery: view images or view fact sheets

Terrestrial Mollusc Tool

1 2 3 4 Next

Arion ater

Arion ater group: Arion rufus

Arion ater group: Arion rufus

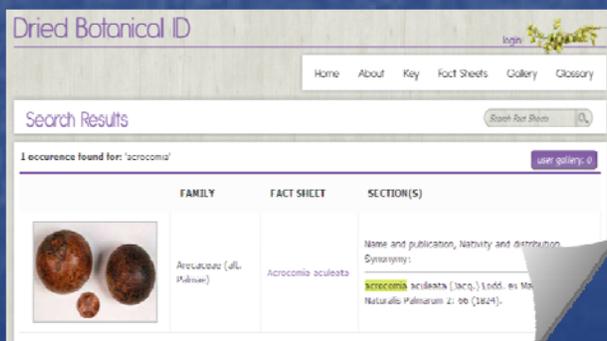
Image viewing capabilities – high resolution, scrolling, and multiple image comparison options

Cooperative Agreement with Colorado State University

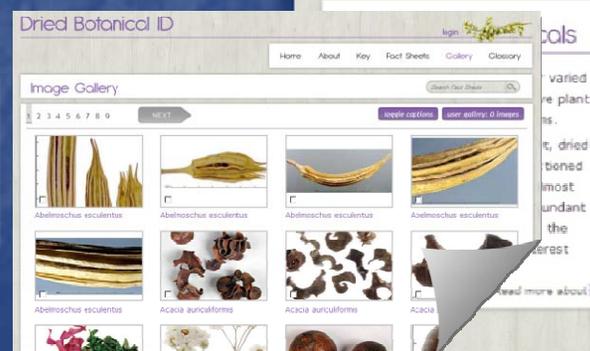
2011 – ITP delivers second relational database tool to our clients in August 2011

Dried Botanical ID

- Clients: designed for non-botanists (characters based on shape, texture, and color)
- Matrix-based key (server-side key & Java applet key options)
- Dynamically generated species fact sheets
- Dynamically generated support pages
- Text search capabilities for site
- Illustrated glossary
- Powerful image viewing functionality
- ITP's first searchable image gallery
- ITP's first create your own image gallery



Text field search results



Searchable image gallery



Home page

Cooperative Agreement with Colorado State University

Text search results page

Search Results

176 occurrences found for: 'potpourri'

Image	FAMILY	FACT SHEET	SECTION(S)
	Fabaceae (alt. Leguminosae), also placed in Mimosaceae	Acacia auriculiformis	Description: the potpourri trade. The pods are very narrow elliptic to elliptic, flat, 3-16 cm long, woody, distinctly twisted, glaucous (when fresh), glabrous, transversely veined, brown (in nat state). Occasionally, seeds are elliptic to broadly elliptic, flattened, 3.6-5.6 mm long, dark brown.
	Asteraceae	Achillea ptarmica	Description: Sneezeweed or sneezewort flower stalks appear as tiny white daisies with cream to brown centers on ribbed stalks. Heads are 7-10 mm across with 6-15 white rays. The double-flowered forms do not seem to be used in potpourri .
	Malvaceae, also placed in Bombacaceae	Adansonia digitata	Description: of this potpourri ingredient. Fruits are velvet capsules, 7-30 cm long, angular-ribbed, woody when dried, and filled with large, woody

Dried Botanical ID

Feature: Symmetry

Bilateral symmetry applies to specimens that are symmetrical along a single line. This line may run in either a vertical or horizontal direction.

Radial symmetry applies to specimens that have symmetry about numerous axes, generally extending from the center of the object.

Translational symmetry is similar to bilateral symmetry, but the reflection is shifted or translated, so that the reflection appears to have been slid along the axis of symmetry.

Helical symmetry is the type of symmetry seen in springs. Slightly toxic and drill bits. It is rotational (radial) symmetry along with translation along the axis of rotation.

Asymmetrical specimens have no line of reflection.

Some entities are so variable that they may fall into more than one of these categories. One piece may have bilateral symmetry while other pieces are asymmetrical. Feel free to choose multiple states if this applies to your specimen.

Feature pages

Glossary

Glossary

Q

accessory fruit: a fleshy fruit with the fleshy part not a part of the pistil

achene: a small, dry, one-celled, one-seeded indehiscent fruit, the seed attached to the pericarp at one place

oculoid: shaped like a needle

occur: tapering to the apex, the sides more or less pinched in before reaching the tip

ocule: tapering to the apex with the sides straight or nearly so

aggregate fruit: a fleshy fruit formed from several to many succulent pistils

anastomosing: branching so as to form a network

opercule: ending in an abrupt slender tip which is not stiff

orf: an outgrowth from the hilum (point of attachment) of a seed that covers or is attached to the seed

orn: threadlike or needlelike tip on a lemma or glume

b

berry: a fleshy, pulpy fruit with innerseed seeds

bilob: two-lobed or two-lobed

Fact sheet index

Dried Botanical ID

Fact Sheet Index

Q

Abelmoschus esculentus	Aeschynomene aspera	Ananas comosus	Anticarsus whitei
Acacia auriculiformis	Albizia lebbekii	Antonia squarrosa	Apocynum androsaemifolium
Achillea ptarmica	Alnus villosa	Antrodia furcata	Apocynum androsaemifolium
Aconitum napellus	Alnus crispedora	Araucaria cunninghamii	Avena sativa
Adansonia digitata	Althaea hirsutissima	Arca calappa	
Pegia marmorea	Amphiphysum eschersonii	Asplenium tuberosum	

b

Bambusa bambusa	Banksia laevissima	Barringtonia speciosa	
Banksia integrifolia	Bombax saepe	Butea monostachya	

c

Calamus andamanicus	Callistocarpum australe	Celastrus orbiculatus	Corymba leucocoma
Calamus viminalis	Calluna vulgaris	Celastrus orbiculatus	Corymba leucocoma
Callitriche maculata	Calluna vulgaris	Celastrus orbiculatus	Corymba leucocoma

Dried Botanical ID

Image Gallery

1 2 3 4 5 6 7 8 9

Image gallery

fruit section, close-up: Photo by Christina Southwick

fruit section: Photo by Christina Southwick

fruit section, close-up: Photo by Christina Southwick

Cochlospermum religio...

Cochlospermum religio...

bracts: Photo © The Lebermuth Company, Inc.

separated bracts: Photo © The Lebermuth Company, Inc.

Cocos nucifera

Cocos nucifera

toggle captions on/off

Image Gallery

Personal image gallery

Key Features Entities View

Features Available: 14

more than 5 cm

Symmetry

radial

bilateral

helical

translational

feature with feature page icon

feature state with illustration

Entities Remaining: 245

fact sheet icon

entity image and gallery access

click here to see all images

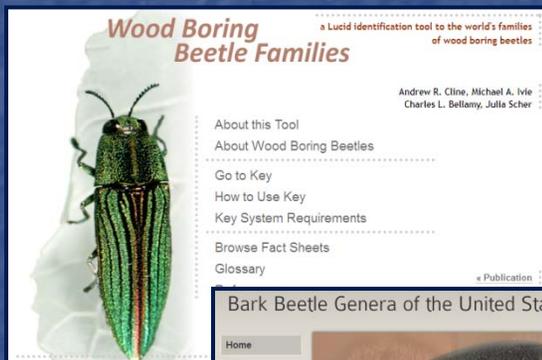
Matrix-based illustrated interactive key

Cooperative Agreement with Colorado State University

The Cooperative Agreement between ITP and Colorado State University...

- Increased ITP's efficiency for product design, product development, product deployment, and product delivery today and for the future
- Significantly increased the quality, value, and usefulness (accessibility, functionality, navigation, viewing, etc.) for ITP's future products

ITP's wood-boring beetle identification tools and resources (2010-2011)



Wood Boring Beetle Families
a Lucid identification tool to the world's families of wood boring beetles

Andrew R. Cline, Michael A. Ivie
Charles L. Bellamy, Julia Scher

About this Tool
About Wood Boring Beetles
Go to Key
How to Use Key
Key System Requirements
Browse Fact Sheets
Glossary

Publication



ONCID ID Tool for Diagnosing Adult Twig Girdlers (Cerambycidae: Lamiinae: Onciderini)

Home | Tools/Guides | Taxa/Genera | Genus/Fact Sheets | Galleries | Identification/Key | Glossary | Subscribers | About

Overview

ONCID ID is designed to aid in the identification of adult twig girdlers, a large group of longhorned beetles in the tree chalcids suborder. They are widely distributed in the temperate and subtropical regions from the US to Argentina. The tool currently contains over 75 genera and 4000 species.

Members of this group are known to attack many woody plant species, including ornamental shrubs and trees. Some species are economic pests, while others are not. Some species are native to the region, while others are introduced. The introduction of exotic twig girdlers into the US poses a serious risk to our native trees.

Last updated January 6, 2012



A Resource for Wood Boring Beetles of the World

Home | IDENTIFY FAMILY | FAMILY TOOL GRABER | GEOGRAPHIC TOOL GRABER | SELECT TOOL | ABOUT THE RESOURCE

A comprehensive resource of identification and screening tools for wood boring beetles of the world.

Getting Started
- Identify a Wood Boring Beetle Family

Newly Released Tools
- View a List of the Latest Identification Tools

Upcoming Tools
- View a List of Tools Currently in Development



Bark Beetle Genera of the United States

Home
Key
Fact Sheets
Glossary
About »
Links

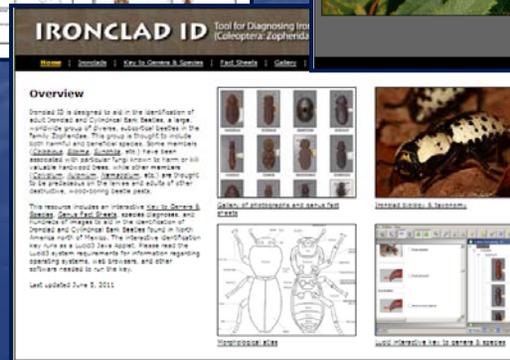


Scolytus

About This Tool
This tool is designed to support the identification of bark beetles (Curculionidae: Scolytinae) to the taxonomic level of genus without the need for expertise [read more...](#)

Bark beetles
Bark beetles are small (0.5 to 9.0 mm long), cylindrical, and usually range from light-brown to black in color. The taxonomic status of the group is not clearly defined. Some experts group them [read more...](#)

Beetle Resource
[Learn more about A Resource for Wood Boring Beetles of the World](#), a comprehensive resource of identification and screening tools for wood boring beetles of the world.



IRONCLAD ID Tool for Diagnosing Iron Clad Bark Beetles (Coleoptera: Zopheridae)

Home | Identify | Taxa/Genera & Species | Fact Sheets | Galleries

Overview

IRONCLAD ID is designed to aid in the identification of iron clad bark beetles, a large group of bark beetles in the family Zopheridae. This group is thought to include both harmful and beneficial species. Some members (including *Zopherus* spp.) have been associated with particular long-lived tree species or with specific geographic areas, while other members (including *Zopherus* spp.) are thought to be introduced to the area and cause of other destructive, wood-boring beetle pests.

This resource includes an interactive [Taxa/Genera & Species](#) [Genus/Fact Sheet](#), [Screening Comparison](#), and [Identification](#) [Tool Grabber](#) and [Geographic Tool Grabber](#) for identifying iron clad bark beetles found in North America and Mexico. The resource also includes a key that can be used to identify iron clad bark beetles. Please read the [tool system requirements](#) for information regarding operating systems, web browsers, and other software needed to run the key.

Last updated June 6, 2011

Cooperative Agreement with Colorado State University

Outcomes from the Cooperative Agreement (post August 2011)

1. ITP takes control of website design, development, and deployment (previously tool developers designed and deployed web sites)
 2. ITP begins using a MySQL relational database and PHP for site design and development for all future tools
 3. ITP begins offering clients the option of a server-side key and a java-enabled applet key
 4. ITP moves from static web pages to dynamic web pages – real time updates
 5. ITP now offers text search capabilities and filtering image galleries
 6. ITP can deliver more products in a shorter amount of time to handle increasing needs and demands by PPQ and cooperators
-

ITP's ID Tool: the Evolution of a Tool

2011 & 2012 – Post Cooperative Agreement Products (3 new tools)

Citrus ID

HOME ABOUT KEY FACT SHEETS GLOSSARY GALLERY MORPHOLOGY

Visit the Cara Cara Fact Sheet

About This Tool
This tool is designed to support the identification of host material during citrus pest and disease surveys by industry and government agency personnel.

Morphology
A general overview of the morphology of cultivated citrus and its relatives is provided. Brief descriptions of each diagnostic plant part are given.

View The Gallery
A comprehensive image gallery is included and is searchable by morphological feature, offering users an image-based identification option.

Visit The Key
Host identification is facilitated through an illustrated matrix-based key. Users may start with any vegetative or reproductive character.

Citrus Diseases

HOME ABOUT KEY FACT SHEETS GLOSSARY GALLERY

Citrus Black Spot

Logrobia

About This Tool
This is a symptom-based tool, designed to support the identification of diseases during citrus disease surveys by industry and government agency personnel.

View The Gallery
A comprehensive image gallery is included and is searchable by morphological feature.

Visit The Key
Disease identification is facilitated through an illustrated matrix and symptom-based key.



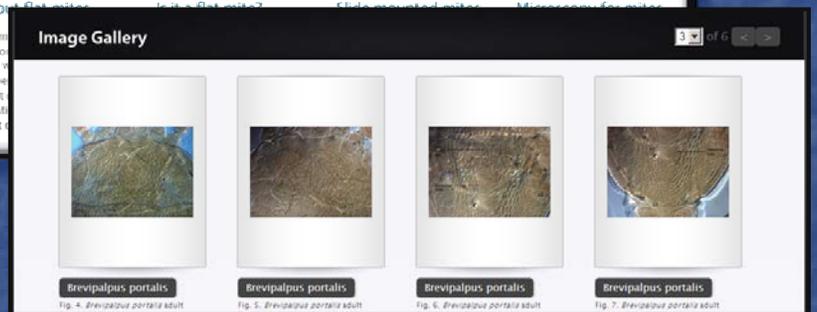
Flat Mites of the World

HOME ABOUT THE TOOL KEY FACT SHEETS GLOSSARY GALLERY

Flat Mites of the World provides a portal to a variety of keys, images, and fact sheets to help support identification of this diverse, potentially destructive group of mites.

Image Gallery

Flat mite micro size, various shape, great variety, most...



About the tool

- About the tool
- Scope
- About flat mites
- Is it a flat mite?
- Sex/stage determination
- About the fact sheets
- Using the keys
- Authors
- Acknowledgements
- System requirements
- References
- Copyright, citation, disclaimers

Is it a flat mite?

Flat mites (family Tenuipalpidae) are related to the spider mites (family Tetranychidae), and both belong to the superfamily Tetranychoidae. Every member of the Tetranychoidae has a characteristic pair of long stylet-like mouthparts used for feeding. These mouthparts are located towards the anterior of the mite, and each member of the pair is J-shaped (only visible once slide-mounted) (Figs 1-4).

Figure 1
J-shaped stylets

Figure 2
elongated J-shaped stylets

Figure 3
J-shaped stylets

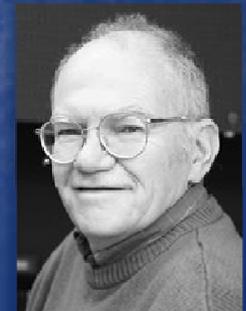
Figure 4
J-shaped stylets

Cooperative Agreement with Colorado State University

Reflections on what made this a successful agreement....

- Right people, right time frame to complete milestones, and most importantly, agreement team's commitment to the work plan objectives
- ADODR provided input on specific classes for student
- Student worked part-time on-site with the ITP team
- Student completed one of the CA milestones as a class project (team approach)
- Student Master's project was based on the agreement's milestones
- Student had access to experts (professors) to provide guidance and support

The ITP / CSU
10-8100-1557-CA
Team



USDA CPHST's Identification Technology Program Team

Terrence Walters, ITP Coordinator [terrence.w.walters@aphis.usda.gov]

Amanda Redford, ITP Tool Developer [amanda.j.redford@aphis.usda.gov]

Julia Scher, ITP Resource Developer [julia.l.scher@aphis.usda.gov]

Christina Southwick, ITP Technician [christina.southwick@aphis.usda.gov]

To receive email announcements about newly released tools: contact Terrence

Access to all ITP Identification Tools: <http://tinyurl.com/ID-Source-ITP>

