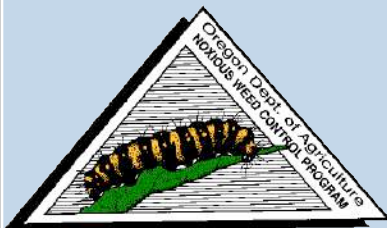


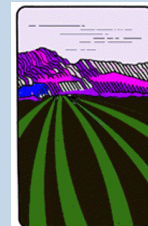
# BIOLOGICAL CONTROL OF WEEDS – *WHAT'S NEW*



**OREGON DEPARTMENT OF AGRICULTURE  
NOXIOUS WEED CONTROL PROGRAM**



**ERIC M. COOMBS**  
[ecoombs@oda.state.or.us](mailto:ecoombs@oda.state.or.us)



**Oregon**  
Department  
of Agriculture

## **BIOLOGICAL CONTROL OF WEEDS**

What is classical biological control?

The purposeful introduction of selected natural enemies of a targeted weed.



# BIOLOGICAL CONTROL OF WEEDS



**Exotic Natural  
Enemy**



**Exotic Pest**



# BIOLOGICAL CONTROL OF WEEDS IN OREGON

- **Insects (71)**
  - beetles (41)
  - flies (15)
  - moths (14)
  - wasp (1)
- **Mites (3)**
- **Nematode (1)**
- **Pathogens (2)**



# BIOLOGICAL CONTROL OF WEEDS IN OREGON

## BIOCONTROL AGENT RELEASE FORMS

### BIOLOGICAL CONTROL AGENT RELEASE FORM

Target Weed Yellow starthistle Date 04 10 20 09  
 Agent Puccinia jacea v. solstitialis Number Released 1600  
 County Josephine T 36S R 5W Sec. 24 1/4  
 Latitude 42.4255 Longitude -123.2322 GPS Derived? Yes  No   
 Land owner: BLM  USFS  Private  USFWS  State  Other  County  
 Land manager Josephine County  
 Site name S. Grants Pass

**SITE DATA:** Check all items that apply and fill in the blanks, please provide a map on back.

Nearest town Grants Pass Road Foothill Blvd. Mile post \_\_\_\_\_  
 Weather: Clear  Partly Cloudy  Cloudy  Rain  Temp F \_\_\_\_\_ Wind \_\_\_\_\_ (MPH)  
 Slope: None  Slight  Moderate  Steep  Aspect: N  S  E  W   
 Soil: Sandy  Loam  Silt  Gravel  Clay  Elevation \_\_\_\_\_  
 Terrain: Valley  Foothill  Mountain  Plain  River  Lake/Pond  Other \_\_\_\_\_  
 Vegetation type: Grassland  Shrubland  Cropland  Riparian/Wetland  Conifer Forest   
 Deciduous Forest  Mixed Forest  Other   
 Plant cover %: Target weed 10 Forbs 10 Grasses 50 Shrubs 10  
 Trees 20 Litter \_\_\_\_\_ Bare ground \_\_\_\_\_

Dominant plant species (List): YST, grass, trees (madrona)  
 Land use: Range  Timber  Wildlife  Right of Way  Pasture  Crop  Vacant   
 Wetland  Recreation  Mining  Other  (List) \_\_\_\_\_

Disturbance factors: Grazing  Logging  Road  Fire  Flood  Cultivation  Construction  Other

Infestation type: Isolated  Patchy  Linear  Continuous

Infestation size < 1A Target weed height 6" Weed density 30  
(Your best estimate) (Acres) (Feet) (sq yd or sq meter)

Plant Phenology: Seedling  Rosette  Bolting  Budding  Flowering  % \_\_\_\_\_ Seeding  Dormant

Is this BC Agent already present? Yes  No  Did not Look  Abundance per minute: \_\_\_\_\_

Other BC Agents present (List): CHSU, CHAU, UASI, BAAD, ECVI

Source of Agents: ODA - Greenhouse Date collected: 4/7/09

Stage released: Egg  Larva  Pupa  Adult  In plant material  Galls  Other

Cooperators: ODFA

Released by: E. Combs, C. Paul (PPA) Reported by: \_\_\_\_\_  
 ODA Database Record # 21410

Directions to release site: S. of Grants Pass on Foothill Blvd. go to where Rd. is about 1/4 mile from County line E side - (south end of strip clearing).

Please draw or attach a map of the release site: Indicate the release site within an "X" in a circle. Indicate North with an arrow. Label roads and features. (This is so someone can find it 10-20 years from now.) A Google Earth Map is also very helpful as an attachment.



Nontarget species information: Are there native plants in the same genus as the target weed present at the release site? Yes  No

List Species: \_\_\_\_\_

Remarks: (Condition of insects, breeding, or egg laying observed, predators, other species present, etc.)

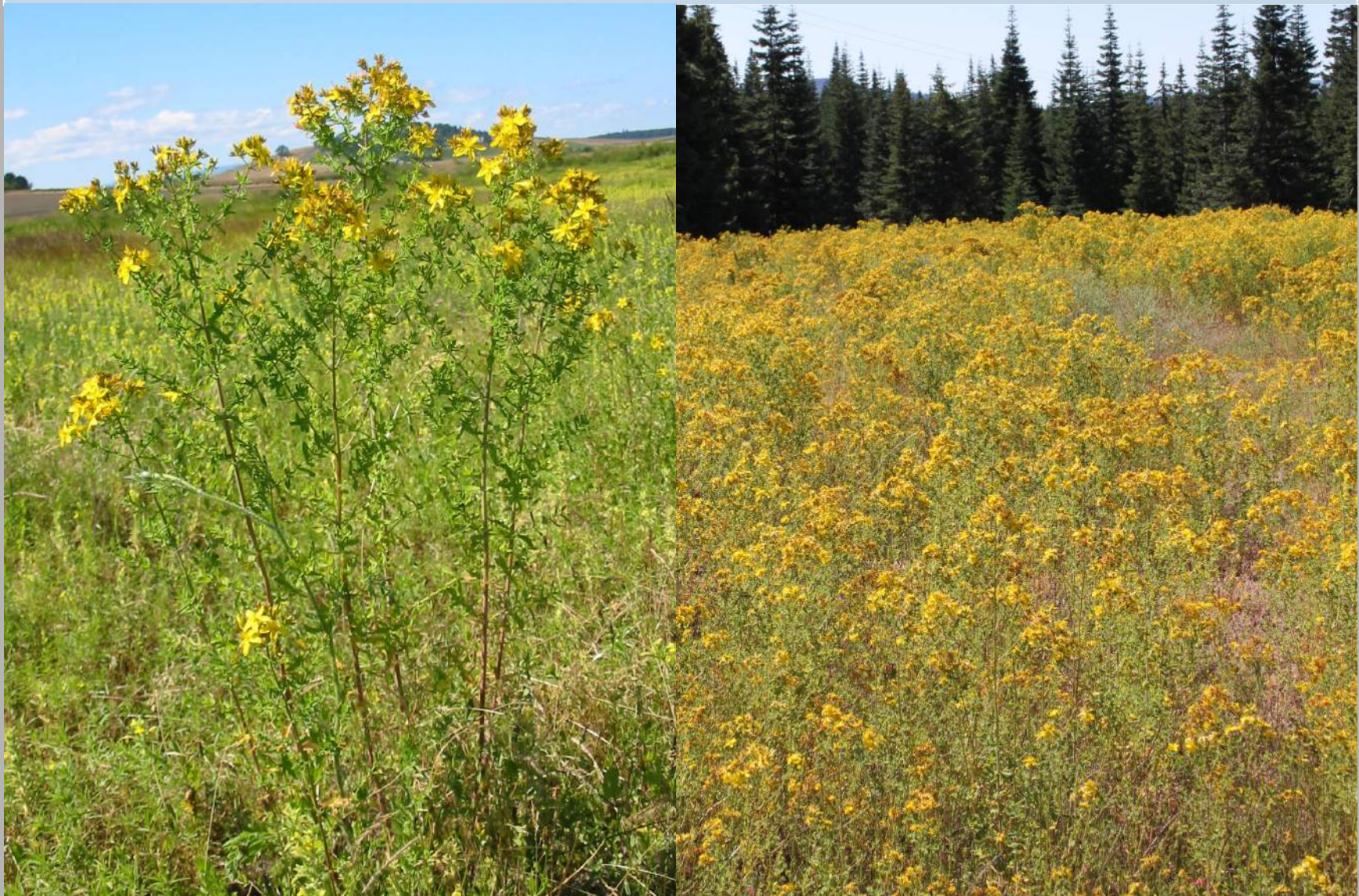
USDA - APHIS or ARS Release Rec. No. (if applicable): \_\_\_\_\_

Please Return this original form to: Weed Control - ODA, 635 Capitol Street NE, Salem, OR 97301-2532

Do not forget to make a copy for your records. If you have any questions, call 503-986-4621.

# **BIOLOGICAL CONTROL OF ST. JOHNSWORT**

*Hypericum perforatum*

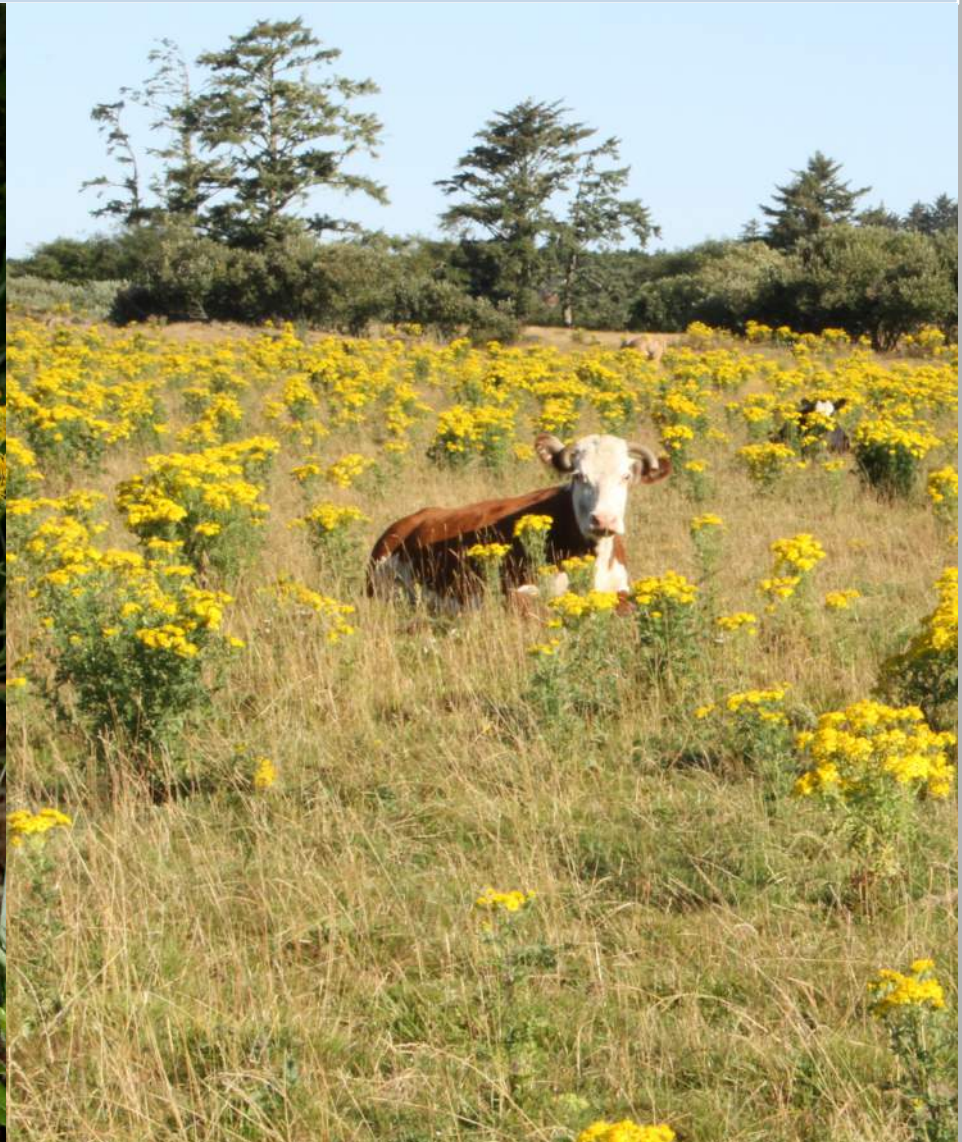


**BIOLOGICAL CONTROL OF  
ST. JOHNSWORT**

*Chrysolina quadrigemina* – leaf beetle



**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**  
*Senecio jacobaea* = (*Jacobea vulgaris*)





**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**

*Tyria jacobaeae* – cinnabar moth



**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**

*Longitarsus jacobaeae* – flea beetle



**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**  
*Senecio jacobaea = (Jacobea vulgaris)*



**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**  
*Senecio jacobaea* = (*Jacobea vulgaris*)



**BIOLOGICAL CONTROL OF  
TANSY RAGWORT**  
*Senecio jacobaea* = (*Jacobea vulgaris*)



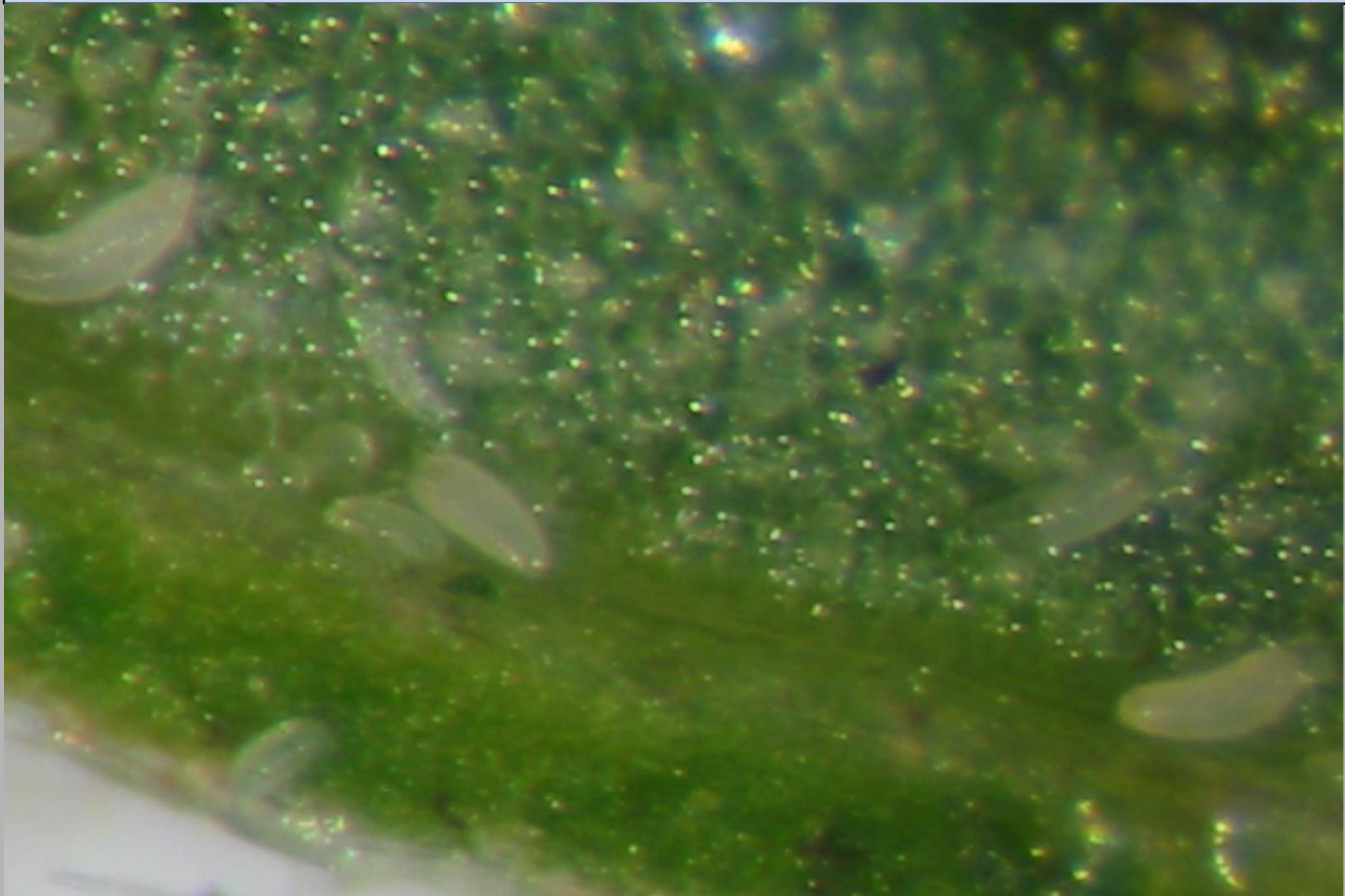
# BIOLOGICAL CONTROL OF FIELD BINDWEED

*Convolvulus arvensis*



**BIOLOGICAL CONTROL OF  
FIELD BINDWEED**

*Aculops malherbae* (Aceria) – gall mite



**BIOLOGICAL CONTROL OF  
FIELD BINDWEED**

*Aculops malherbae* (Aceria) – gall mite





**BIOLOGICAL CONTROL OF  
FIELD BINDWEED**

*Tyta luctuosa* – defoliating moth



**BIOLOGICAL CONTROL OF  
FIELD BINDWEED**

*Tyta luctuosa* – defoliating moth



# BIOLOGICAL CONTROL OF PUNCTUREVINE

*Tribulus terrestris*



**BIOLOGICAL CONTROL OF  
PUNCTUREVINE**

*Microlarinus lareynii* – seed weevil



**BIOLOGICAL CONTROL OF  
PUNCTUREVINE**

*Microlarinus lareynii* – seed weevil



**BIOLOGICAL CONTROL OF  
PUNCTUREVINE**

*Microlarinus lareynii* – seed weevil



# **BIOLOGICAL CONTROL OF RUSSIAN KNAPWEED**

*Acroptilon repens*



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Jaapiella ivannikovi* – bud gall midge





**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Jaapiella ivannikovi* – bud gall midge



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Jaapiella ivannikovi* – bud gall midge



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Jaapiella ivannikovi* – bud gall midge



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Aulacidea acroptilonica* – stem gall wasp



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Aulacidea acroptilonica* – stem gall wasp



**BIOLOGICAL CONTROL OF  
RUSSIAN KNAPWEED**

*Aulacidea acroptilonica* – stem gall wasp



# **BIOLOGICAL CONTROL OF DALMATIAN TOADFLAX**

*Linaria dalmatica (genistifolia)*



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



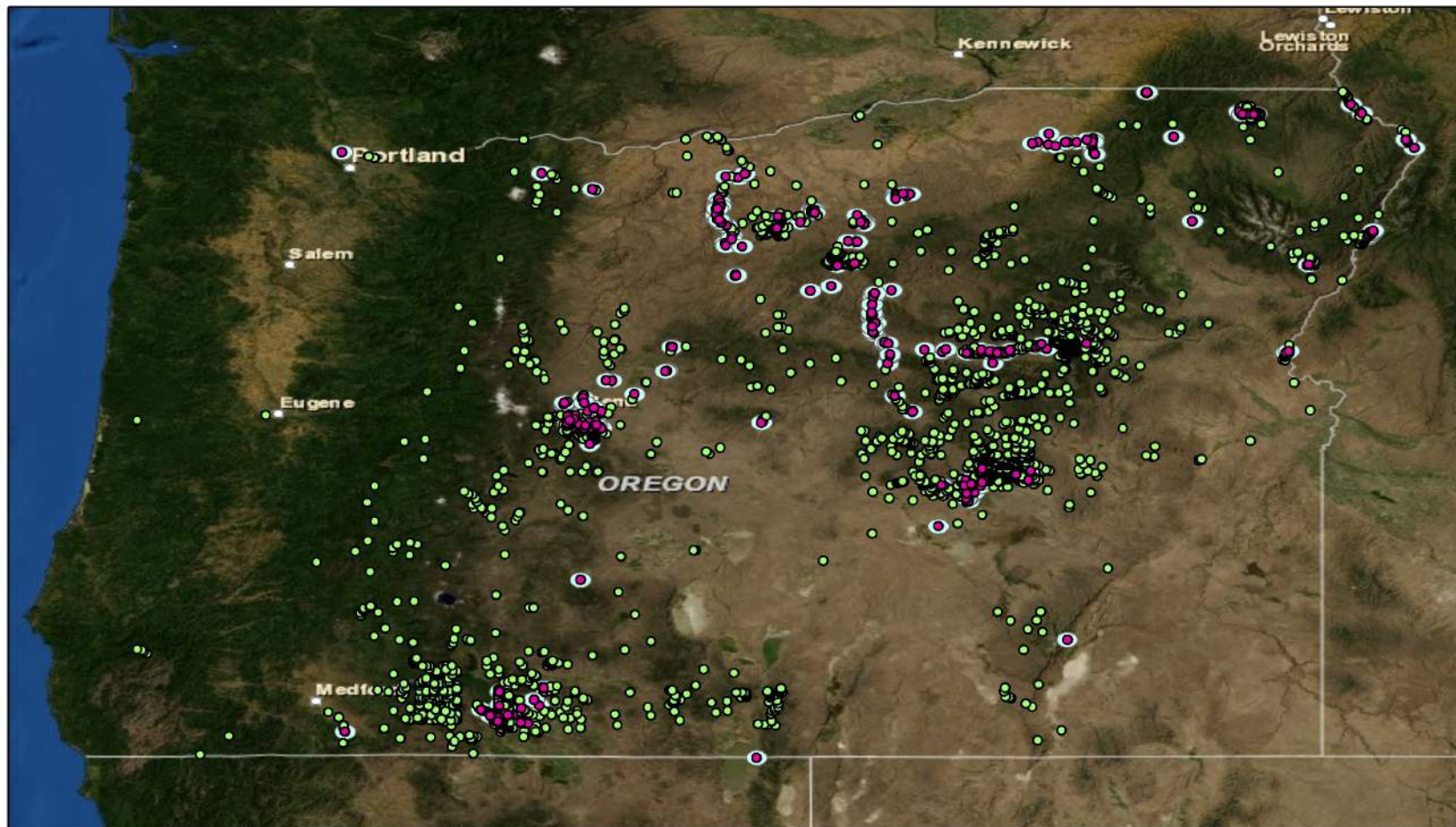


**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



Overview Map of LIDA and *Mecinus janthinus* Distribution:  
5 KM buffer around *M. janthinus* Release



**Legend**

- *Mecinus janthinus* Release
- LIDA
- messinus\_5km\_buff



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**  
*Mecinus janthinus* – stem weevil



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



**BIOLOGICAL CONTROL OF  
DALMATIAN & YELLOW TOADFLAX**

*Mecinus janthinus* – stem weevil



# **BIOLOGICAL CONTROL OF YELLOW STARHISTLE**

*Centaurea solstitialis*





**BIOLOGICAL CONTROL OF  
YELLOW STARHISTLE**

*Puccinia jacea* var. *solstitialis* – rust fungus



**BIOLOGICAL CONTROL OF  
YELLOW STARHISTLE**

*Puccinia jacea* var. *solstitialis* – rust fungus



# **BIOLOGICAL CONTROL OF ARMENIAN (HIMALAYAN) BLACKBERRY**

*Rubus armeniacus*

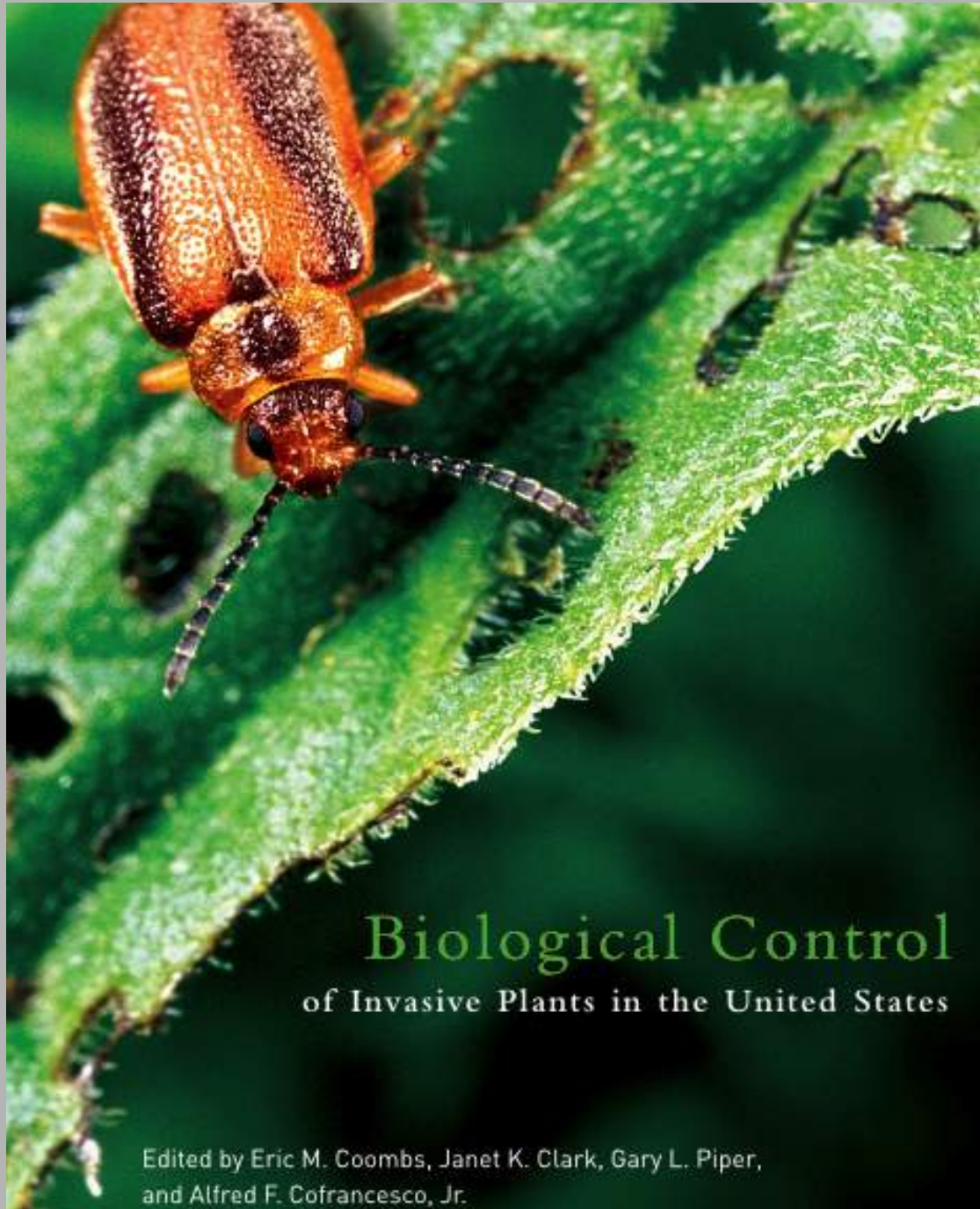


**BIOLOGICAL CONTROL OF  
ARMENIAN BLACKBERRY**  
*Agrobacterium* ? – crown gall fungus



**BIOLOGICAL CONTROL OF  
ARMENIAN BLACKBERRY**  
*Agrobacterium ? – crown gall fungus*





**Biological Control**  
of Invasive Plants in the United States

Edited by Eric M. Coombs, Janet K. Clark, Gary L. Piper,  
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