Identification of the Origins of Coniatus sp., a Non-Native Weevil in Western North America
Outline

• Intro
  – History in US
  – Identification
  – Range

• Questions
  – One/multiple introductions
  – Origin
    • Molecular phylogenetics
  – Lifecycle
  – Polymorphisms
    • Color
    • Pupal case
  – Impact on tamarisk
    • Shoots
    • Flowers
First sightings in US in 2006 in Arizona

- Non-native to North America
- First published report in 2011
Range of *Coniatus* sp. in North America
• 24 species in genus *Coniatus*
• Believed to be natural predators of *Tamarix* species
• Other *Coniatus* species have been studied and evaluated as possible biocontrol agents for tamarisk
  – *C. repandus*,
  – *C. tamarisci*
  – *C. stevini*
• *C. tamarisci* was approved by the Technical Advisory Group for Biological Control Agents of Weeds
  – no known intentional releases of any of *Coniatus* species have been made in US
Native Ranges of four *Coniatus* spp.

Based on Catalogue of Palaearctic Coleoptera
Questions

– One/multiple introductions?
– Origin?
  • Molecular phylogenetics

CO1 analysis
Tom Dudley, Karen Rosen, Dan Bean, Levi Jamison
Overseas collections

Massimo Cristofaro, Francesca Marini, René Sforza, Amanda Stahlke, Laibale Friedman
Maximum Parsimony analysis of the data set was performed using PAUP* v.4.b10 (Swofford, D. L. 2002). The bootstrap number was 1000 with 755 total characters and 217 informative characters.

North American samples display little to none variation in CO1 (1296 bp)

Single introduction

Bootstrap 50% majority-rule Consensus tree

N. America
Maximum Parsimony analysis of the data set was performed using PAUP* v.4.b10 (Swofford, D. L. 2002). The bootstrap number was 1000 with 755 total characters and 217 informative characters.
North American samples do NOT group with *Coniatus splendidulus*

Species designations may need to be redone in the genus using DNA markers

Use of museum specimens which have already been taxonomically identified based on morphology

Bootstrap 50% majority-rule Consensus tree

Maximum Parsimony analysis of the data set was performed using PAUP* v.4.b10 (Swofford, D. L. 2002). The bootstrap number was 1000 with 755 total characters and 217 informative characters.
North American samples DO group with specimens collected near Shiraz, Iran

Bootstrap 50% majority-rule Consensus tree

Maximum Parsimony analysis of the data set was performed using PAUP*v.4.b10 (Swofford, D. L. 2002). The bootstrap number was 1000 with 755 total characters and 217 informative characters.
Best Match: Shiraz, Iran
Questions

– One/multiple introductions
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  • Pupal case
Life cycle of the *Coniatus* sp. collected in GJ, CO

Insects were raised in an incubator at 25C at 14L:10D light cycle (similar to the day length observed in GJ late May/early June)

5-7 days

Egg to Adult ~35 days
Color morphs
Color polymorphisms throughout the season
Pupal case polymorphisms
Questions- and some answers

– One/multiple introductions

– Origin
  • Molecular phylogeny

– Lifecycle
  • 3-4 generations/season
  • Long lifespan >12 months
  • Found on tamarisk March-late November

– Polymorphisms
  • Color
  • Pupal case
    • Seems to be dependent on the time of the season
    • not due to sex of the larvae
    • May be an inherited trait
Questions

– One/multiple introductions
– Origin
  • Molecular phylogenetics
– Lifecycle
– Polymorphisms
  • Color
  • Pupal case
– Impact on tamarisk
  • Shoots
  • Flowers
Coniatus adults feed on the tip of the shoots
Oviposition at the shoot tips
Oviposition at the shoot tips AND flower buds – lower seed production?
Questions- and some answers

– One/multiple introductions
– Origin
  • Molecular phylogenetics
– Lifecycle
– Polymorphisms
  • Color
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– Impact on tamarisk
  • Shoots
  • Flowers

*Coniatus* has the potential to stunt the plant growth and lower seed production.
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