

Begin Key

# KEY TO THE *Agrilus* OF THE WESTERN U.S.A.



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# Contributions and Acknowledgements

Daniel Clark, ODA: Testing and reviewing the key

Joshua Dunlap, ODA: Acquisition and processing of the images

Corwin Parker: Testing and reviewing the key

Tom Valente: Reviewing the key

Richard Westcott, ODA (retired): Specimens, taxonomic advice, review of the key

ODA: Use of the imaging system, the entomology museum, and general support

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# Introduction

This is an image based to key to *Agrilus* species found in the western United States. Images of all character states are provided. The key is biased towards species that attack trees, as a result, some species that attack desert shrubs from arid areas are not included\*. Several eastern pest species not known from the West are included as are some high-risk pest species not yet detected in North America.

\*\*The key will be most reliable for the Rocky Mountains and areas to the west. It will not function as well with species found in the areas bordering Mexico and east of the Rockies.

\*\*\*It is not intended to operate completely independently of support by a taxonomist but instead in the context of a presented workshop.

\*Missing western species (74 species mostly from southern areas of AZ, CA, NM, and TX): *abductus*, *abstersus*, *aenocephalus*, *albocomus*, *arizonicus*, *arizonus*, *asperulus*, *audax*, *aureus*, *aurilaterus*, *baboquivariae*, *barberi*, *benjamini*, *catalinae*, *cavatus*, *cavifrons*, *celti*, *cercidi*, *chiricahuae*, *cliftoni*, *cochisei*, *concinus*, *coxalis*, *defectus*, *delicatulus*, *duncani*, *eleanorae*, *falli*, *ferrisi*, *flohri*, *fuscipennis*, *geminatus*, *geronimoi*, *harenus*, *heterothecae*, *howdeni*, *huachuchae*, *hualpaii*, *imbellus*, *jacobinus*, *lataifrons*, *lecontei celticola*, *limpiae*, *macer*, *mimosae*, *montosae*, *muticus*, *neabditus*, *oblongus*, *obscurilineatus*, *obtusus*, *olentangyi*, *ometauhtli*, *ornatulus*, *parkeri*, *parvus californicus*, *pectoralis*, *pseudofallax*, *pubescens*, *quercus*, *restrictus*, *rubroniger*, *sampindi*, *scitulus*, *shoemakeri*, *snowi*, *subcinctus*, *townsendi*, *waltersi*, *wenzeli*, *hespenheidei*, *inhabilis chalcogaster*, *inhabilis cuprinus*, and *rubrovittatus*.

# Key and Screening Aid Use: I

The key and screening aid function much like traditional dichotomous keys with couplets. However, extensive use of PowerPoint navigational features, such as buttons linking non-sequential couplets and enabling return to the originating couplet, have been utilized.

If there are more images than can fit on a single slide, the multiple slides for the couplet are indicated by “part 1 of 2”, “part 2 of 2”, etc., following the couplet number at the top of the slide.

When a species is reached in a key, at the end of the couplet a size range, hosts, and distribution will be included.

**Size range:** There is limited data for many species, especially for native western species.

**Hosts:** Only documented larval hosts are listed. For many species, larval hosts have not been observed.

**Distribution:** With active movement of plants and firewood, introductions to new areas happen frequently. Don't doubt a species identification simply because it is not known from an area.

# Key and Screening Aid Use: II

Most terms and character states are explained via the images and associated labels. The first several slides following the introduction illustrate the basic body parts of buprestids and the terms applied to them. A single slide explaining a few technical terms follows those.

If you think you have identified a new **exotic species** or a new record for a state, **please report them to ODA or other appropriate entities or experts.** **Couplets dealing with species exotic to the western US have text in red.** Woodboring insects are routinely introduced into North America and firewood and other untreated wood products, especially firewood, are enabling the distribution of those species, as well native species throughout the United States.



# Example: 2(1) part 1 of 2



Yellow button with title takes you back to previous couplet

Button above takes you to the beginning of the key

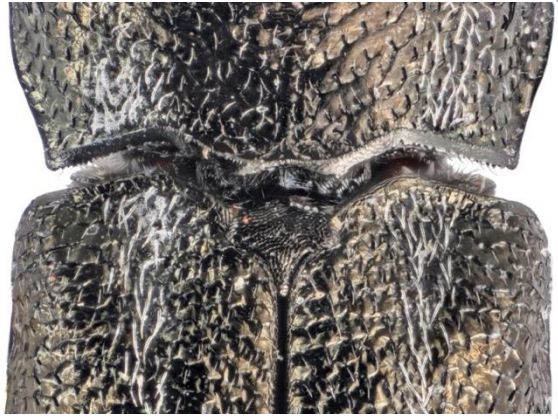
"1 of 2" indicates that there are more images on the second, following slide

t carinate; prehumeral carina absent; anterior claws 5mm; host unknown; CA, NE, NM, NV, TX, U...  
th; not distinct...  
...*ventralis* Horn

Scutellum carinate; prehumeral carina distinct; anterior claws turned in and touching (or nearly so); bearded; larval host *Acer* spp. and *Aesculus glabra*; 4... known as far west as MS and TX

The first couplet half is imaged on the left of the blue dividing line and the second on the right.

*masculus* Horn

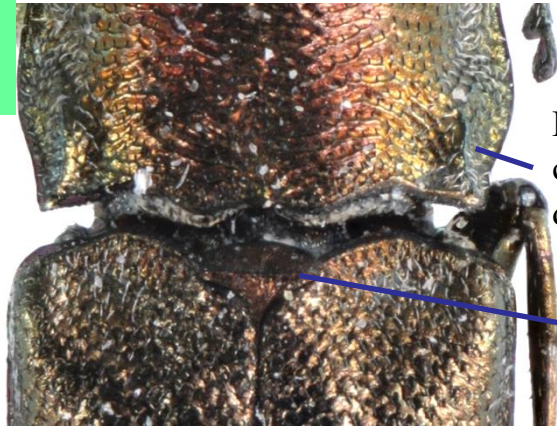


No "beard" although setae present

*A ventralis*



Characters described in the couplet should be illustrated and are often descriptively labeled.



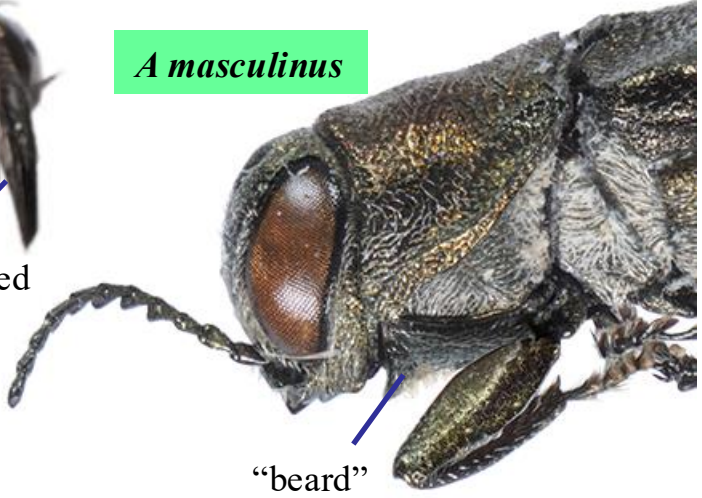
Prehumeral carina distinct

Carina on scutellum



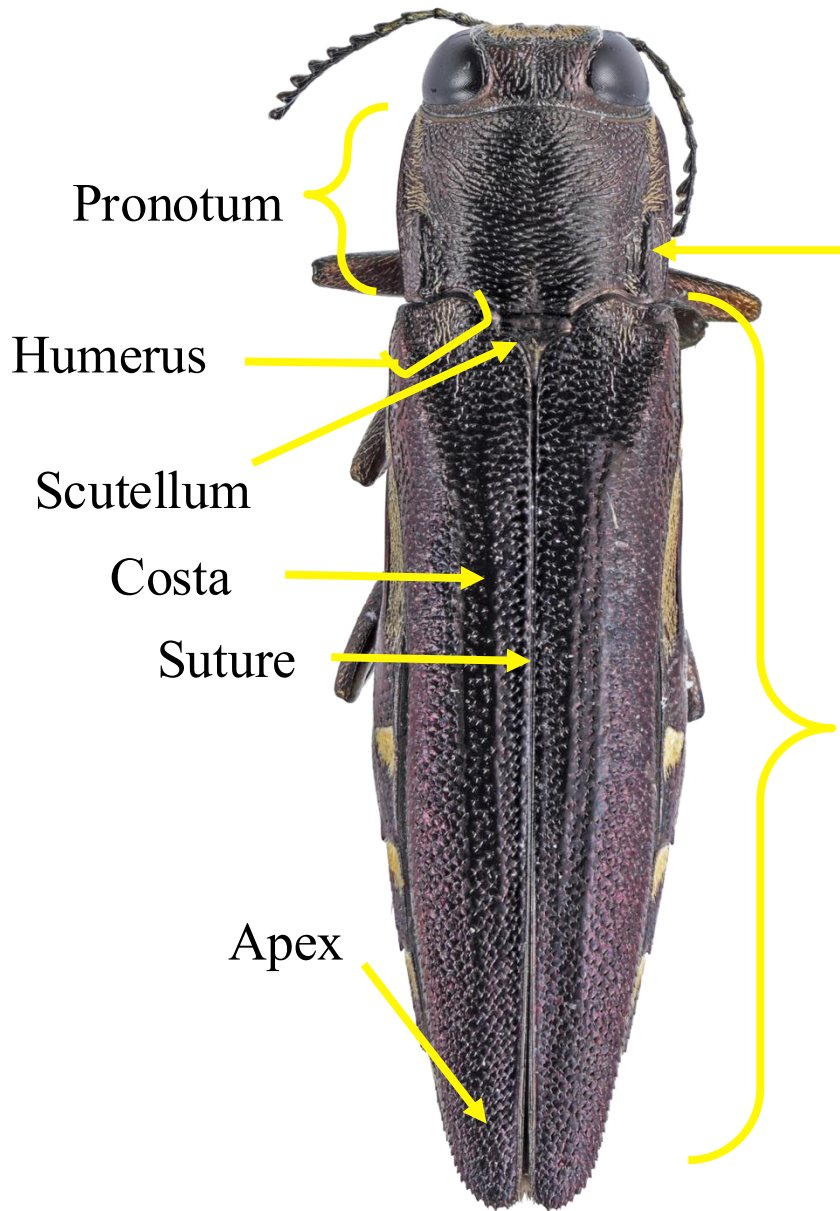
Claws turned in, nearly touching

*A masculinus*



"beard"

# BASIC BODY PARTS OF BUPRESTIDS: I

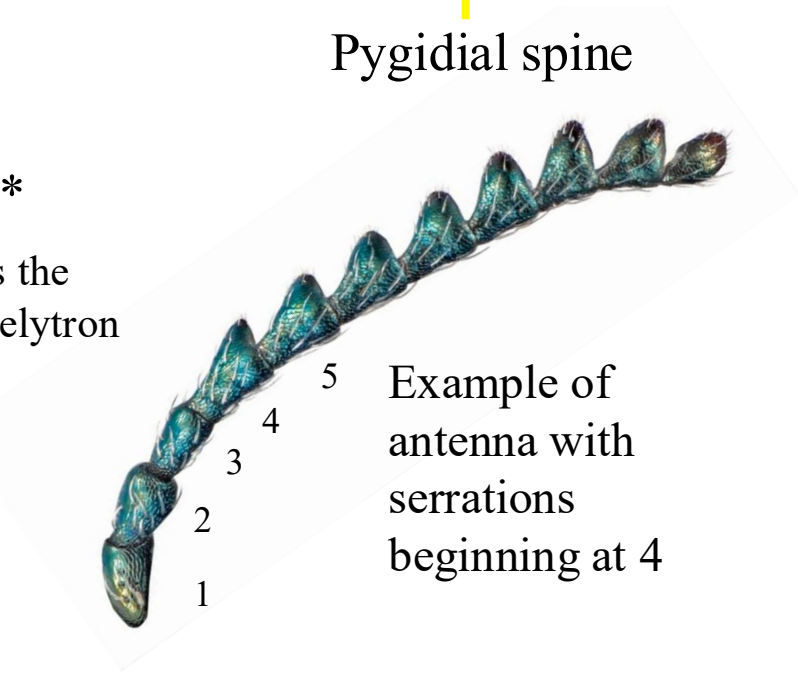


Prehumeral carina

Elytron\*  
\*Elytra is the plural of elytron

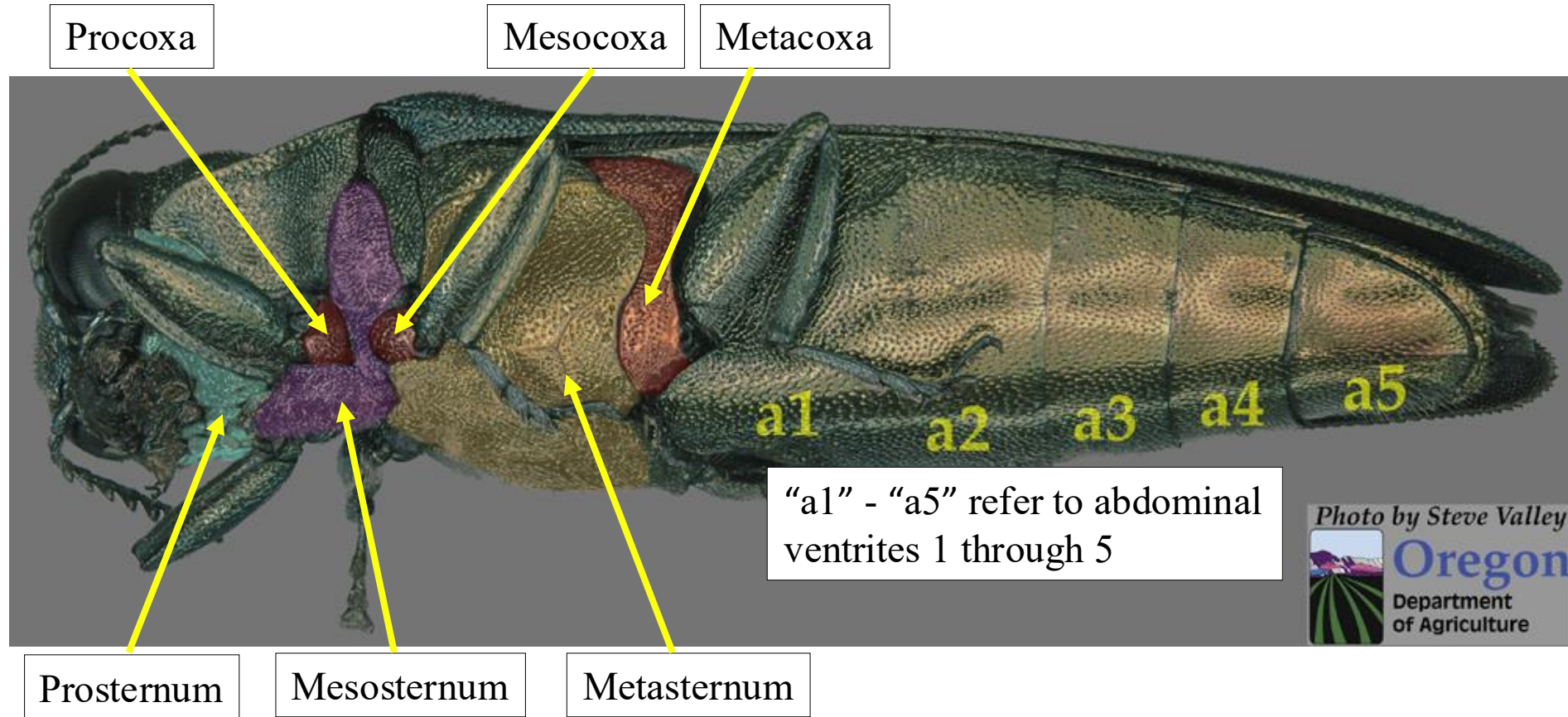


Pygidial spine

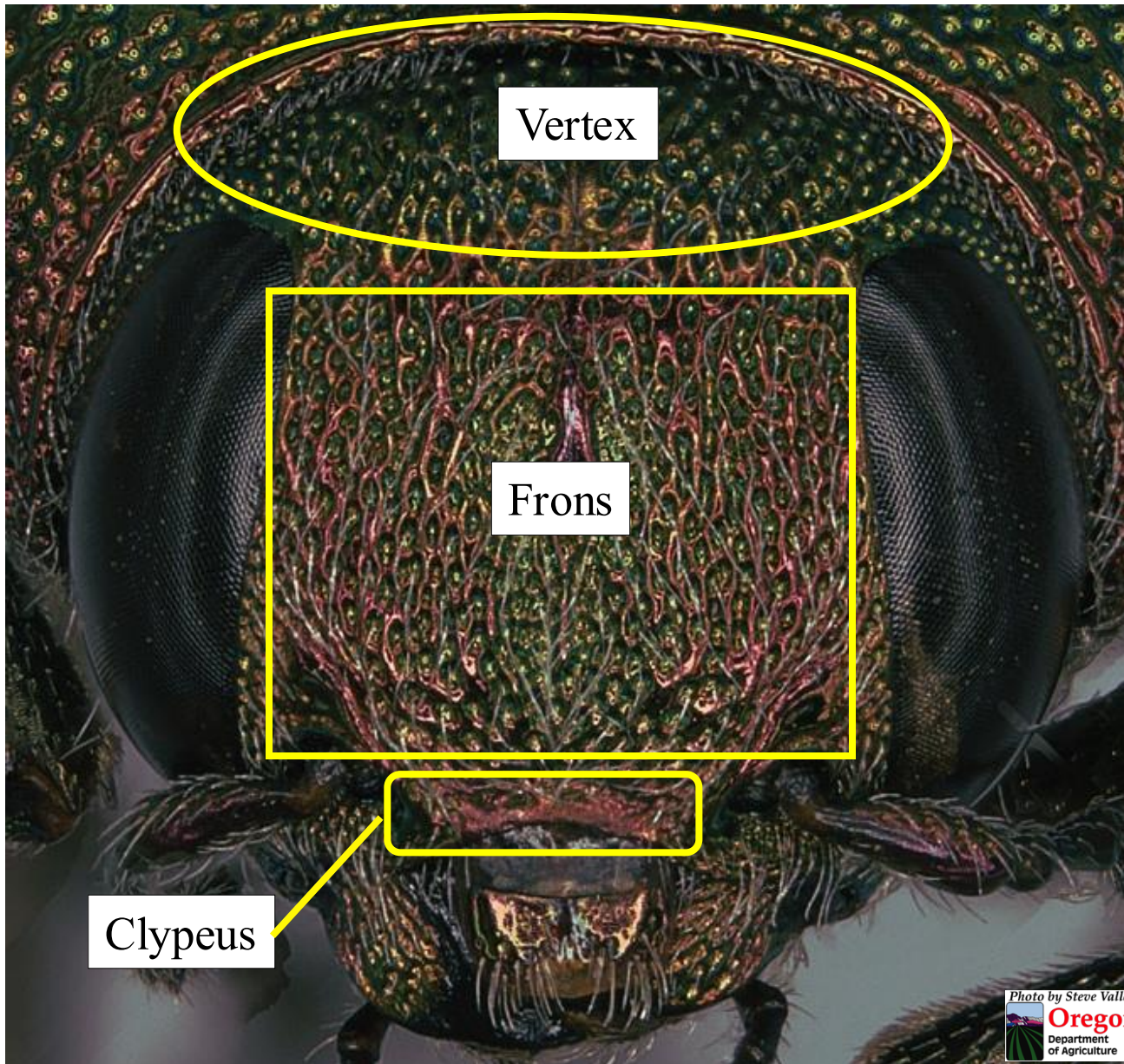


Example of antenna with serrations beginning at 4

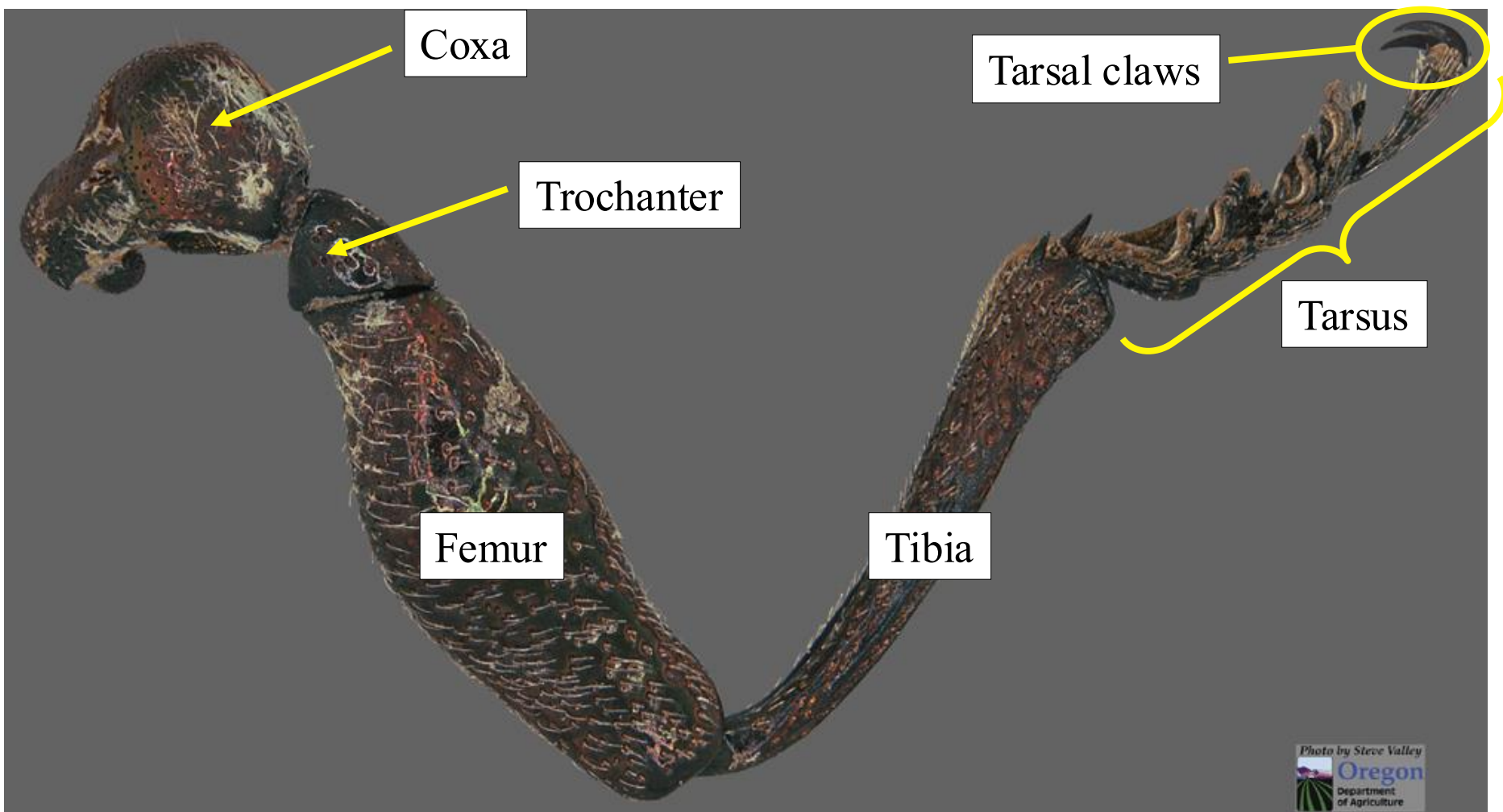
# BASIC BODY PARTS OF BUPRESTIDS: II



# BASIC BODY PARTS OF BUPRESTIDS: III



# BASIC BODY PARTS OF BUPRESTIDS: V



# A Few Technical Terms

**Acuminate:** strongly and abruptly tapered to a narrow apex

**Arcuate:** arched

**Carina:** an elevated ridge (plural is “Carinae”)

**Elytral:** of or on an elytron or the elytra

**Microsculpture:** surface sculpturing generally not visible at 30x or less

**Pubescence:** short, fine, closely set hair-like structures

**Pubescent:** covered with pubescence

**Punctate:** with punctures

**Rugae (or as rugose):** ridges or wrinkles

**Sculpticell:** tiny, individual areas of cuticle defined by a thin line

**Serrate:** with notched edges like the teeth of a saw

**Seta:** relatively long, stiff hair-like structures (plural is “Setae”)

**Setose:** covered with setae

**Sinuate:** referring to a structure or the margin of a structure is winding or wavy

**Strigae:** fine, impressed lines or streaks. “Strigate” = with strigae.

**Transverse:** running across the longitudinal axis at right angles

**Truncate:** squared off

**Venter:** underside. “Ventral” = on venter.



# *Agrilus*

## *Agrilus* Curtis 1825

174 species in North America

Widespread



Key to 58 species of  
*Agrilus* of Western North  
American and select exotic  
species of concern



*A. anxius*



*A. granulatus*



*A. illectus*



*A. pubifrons*



*A. quadriguttatus*



*A. vittaticollis*



*A. politus*



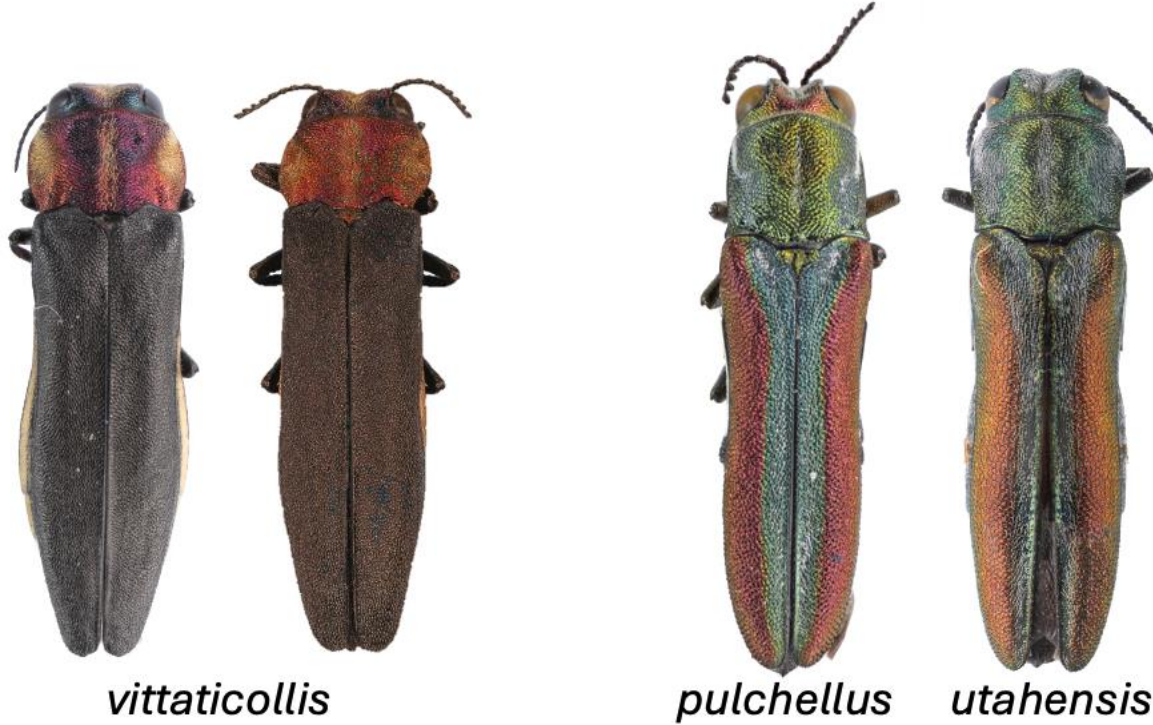
*A. walsinghami*



## *Agrilus* species covered in this Guide

<u>Species</u>	<u>Author</u>						
<i>abditus</i>	Horn	<i>derasofasciatus</i>	LaCordaire	<i>lacustrus</i>	LeConte	<i>quadriguttatus</i>	Fisher
<i>acutipennis</i>	Mannerheim	<i>difficilis</i>	Gory	<i>macer</i>	LeConte	<i>fulminans</i>	Horn
<i>amelanchieri</i>	Knull	<i>egeniformis</i>	Champlain and Knull	<i>mali</i>	Matsumura	<i>quadriguttatus</i>	Gory
<i>angelicus</i>	Horn	<i>egenus</i>	Gory	<i>malvastri</i>	Fisher	<i>quadriguttatus</i>	Fisher
<i>anxius</i>	Gory	<i>fallax</i>	Say	<i>masculus</i>	Horn	<i>quercicola</i>	Schaefer
<i>auriventris</i>	Jendek	<i>felix</i>	Horn	<i>nevadensis</i>	Horn	<i>ribesi</i>	Schaefer
<i>arbuti</i>	Fisher	<i>fisherianus</i>	Knull	<i>obsoletoguttatus</i>	Gory	<i>ruficollis</i>	Fabricius
<i>auroguttatus</i>	Schaeffer	<i>fleischeri</i>	Obenberger	<i>palmerleei</i>	Knull	<i>sierrae</i>	Van Dyke
<i>biguttatus</i>	Fabricius	<i>gibbicollis</i>	Fall	<i>paracelti</i>	Knull	<i>smaragdafrons</i>	Ganglebauer
<i>bilineatus</i>	(Weber)	<i>granulatus</i>	(Say)	<i>paraimpexus</i>	Hespenheide	<i>subrobustus</i>	Saunders
<i>blandus</i>	Horn	<i>granulatus</i>	Barter & Brown	<i>parvus parvus</i>	Saunders	<i>sulcicollis</i>	LaCordaire
<i>burkei</i>	Fisher	<i>granulatus</i>	Fisher	<i>planipennis</i>	Fairmaire	<i>utahensis</i>	Westcott in Nelson & Westcott
<i>cephalicus</i>	LeConte	<i>populi</i>		<i>politus</i>	(Say)	<i>ventralis</i>	Horn
<i>crataegi</i>	Frost	<i>horni</i>	Kerremans	<i>pubifrons</i>	Fisher	<i>vittaticollis</i>	(Randall)
<i>cuprescens</i>	(Menetries)	<i>hyperici</i>	Creutz.	<i>pulchellus</i>	Bland	<i>walsinghami</i>	Crotch
<i>cyanescens</i>	(Ratzeburg)	<i>illectus</i>	Fall	<i>putillus</i>	Knull		
		<i>impexus</i>	Horn	<i>parputillus</i>			

# Comparative Plate 1 of 9



Nine plates of dorsal images of the *Agrilus* species included in this key. Where possible, multiple images showing variation are included, although some variants are missing. The images are arranged by general appearance, as determined by the authors, in order to group similar appearing species on the same plate.



*horni*



*anxius*



*anxius*



*anxius*



*paracelti*



*cephalicus*



*lacustris*



*putillus*



*parputillus*



*macer*



*egenus*



*sierrae*



*politus*



*difficilis*



*politus*



*quadriguttatus*  
*quadriguttatus*

*macer*

*cuprescens*

*cephalicus*

*ribesi*

*abditus*

*politus*



*crataegi*

*granulatus*  
*granulatus*

*hyperici*

*cuprescens*

*crataegi*

*cuprescens*

*nevadensis*



*mali* female

*arbuti*

*derasofasciatus*

*planipennis*

*cuprescens*

*subrobustus*



*sulcicollis*

*lacustris*

*egeniformis*

*planipennis planipennis*

*malvastri*

*sulcicollis*



*lacustris*



*quadriguttatus  
fulminans*



*planipennis*



*cuprescens*



*politus*



*politus*



*cyanescens*



*cyanescens*



*quadriguttatus*



*politus*



*acutipennis*



*acutipennis*



*walsinghami*





*walsinghami*



*walsinghami*



*granulatus populi*



*quadriguttatus*  
*quadriguttatus*  
by Jason Hansen



*granulatus*



*granulatus liragus*



*granulatus*  
*granulatus*



*auroguttatus*



*paraimpexus*



*impexus*



*obsoleteguttatus*



*fallax*



*fleischeri*



*lecontei*



*auriventris*

Image from Jendek and Grebennik 2011



*auriventris*



*egeniformis*



*paracelti*



*egeniformis*



*paraimpexus*



*fleischeri*



*mali* male

Image by Daniel Mietchen from Wiki Commons



*biguttatus*



*biguttatus*



*bilineatus*



*pubifrons*



*felix*



*malvastris*



*bilineatus*



*illectus*



*fisherianus*



*pubifrons*



*blandus*



*illectus*



*ventralis*





*ruficollis*



*parvus*



*angelicus*



*parvus*



*amelanchieri*



*masculus*



*angelicus*



*arbuti*



*smaragdifrons*



*palmerleei*



*ribesi*



*parvus*



*quercicola*



# 1: part 1 of 3

Each elytron with three orange patches of pubescence; dorsum of pronotum with a patch of orange pubescence at and posterior to each anterior angle; portraits; 9-12mm; *Quercus* spp.; AZ to central America and introduced to CA. Exotic to most of the western US: Report! ..... *auroguttatus* Schaeffer, (gold-spotted oak borer)\*



\*Rare specimens of *A. g. granulatus* may key here.

Elytra and dorsum of pronotum without distinctly orange pubescent patches ..... 2



*A. g. granulatus*

Elytra without 3 orange pubescent patches

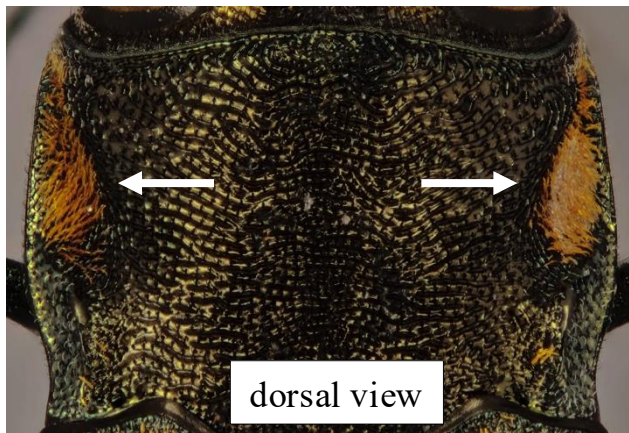
# 1: Part 2 of 3

Each elytron with three orange patches of pubescence; dorsum of pronotum with a patch of orange pubescence at and posterior to each anterior angle; portraits; 9-12mm; *Quercus* spp.; AZ to central America and introduced to CA. Exotic to most of the western US: Report! ..... *auroguttatus* Schaeffer, (gold-spotted oak borer)\*



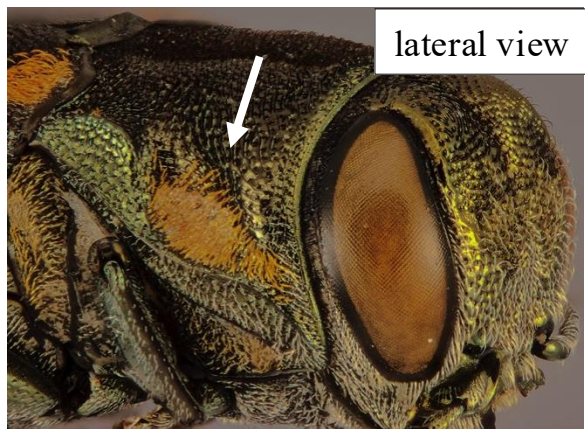
\*Rare specimens of *A. g. granulatus* may key here.

Elytra and dorsum of pronotum without distinctly orange pubescent patches ..... 2

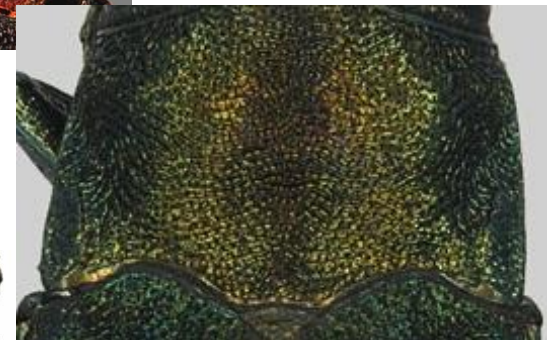


dorsal view

Dorsum of pronotum with patches of orange pubescence.



lateral view



Pronotum without dense patches of pale pubescence.



*Agrilus*  
*auroguttatus*  
Schaeffer,  
the Gold-spotted  
Oak Borer





# 2 (1)



Elytra with a green or blue-green stripe along the suture and lateral areas red to orange ..... 3



Elytra of various colors, but without orange or red lateral areas on elytra ..... 4



Red or orange stripe

Dark stripe at suture



# 3 (2):

Submarginal carina present; scutellum without carina and deeply impressed; 9.5mm; host *Erigeron* spp.; AZ, CO, KS, NM and TX ..... *pulchellus* Bland

Submarginal carina absent or weak (Nelson and Westcott 1991); scutellum without carina but flat; 7.4-8.4mm; host unknown; UT and AZ ..... *utahensis* Westcott in Nelson and Westcott

Both marginal and submarginal carinae present

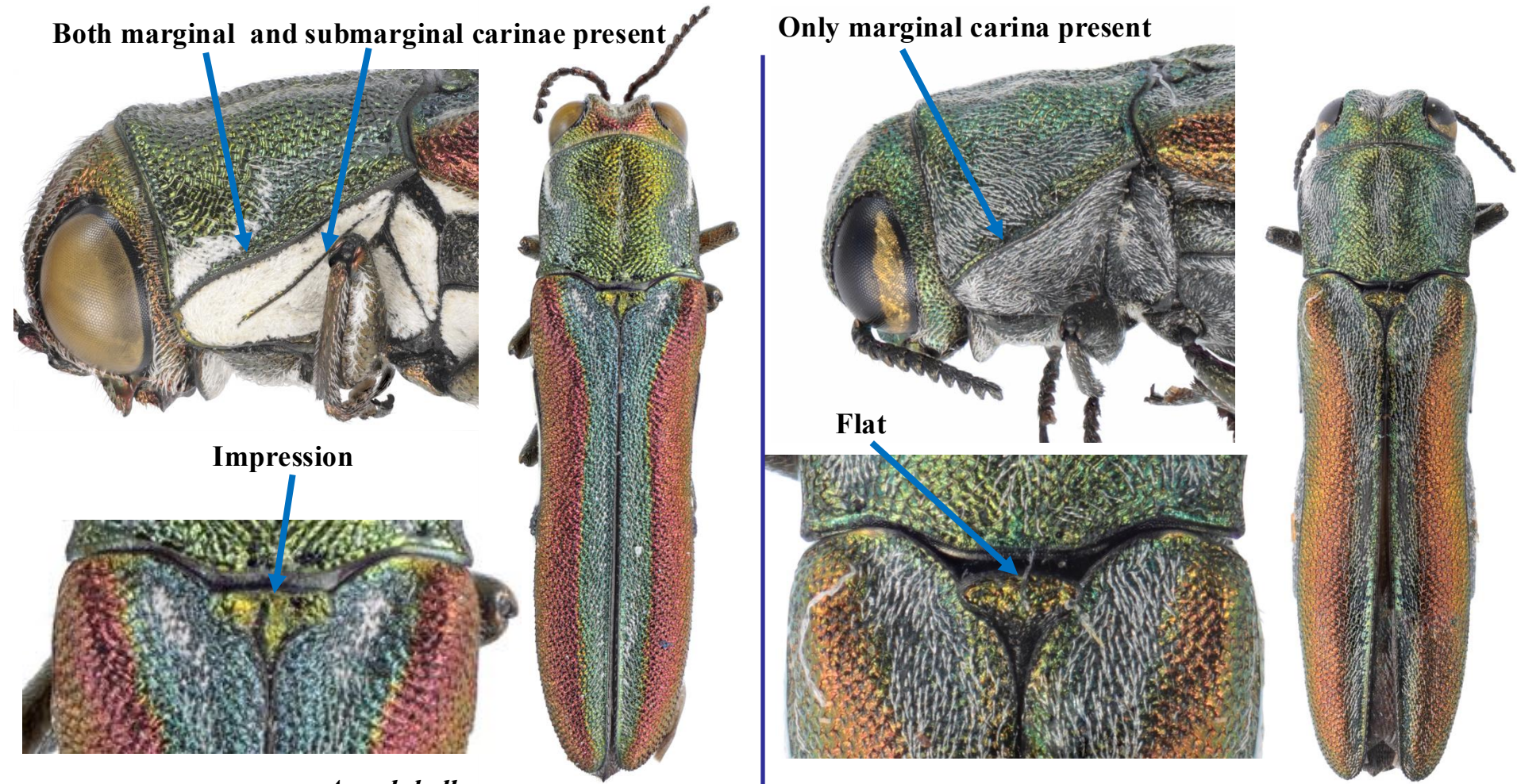
Only marginal carina present

Impression

Flat

*A. pulchellus*

*A. utahensis*





4 (2)



Apex of elytra produced and acute; 10.5mm; host *Salix lucida*; CA, NV, and OR ..... *nevadensis* Horn

Elytral apex not produced although the apex may be acute ..... 5



Sharp, tapering elytral apices





Beginning

5 (4)



Elytra with irregular setal pattern covering the entire elytral surface; 5-8.8mm; host *Citrus* spp and *Malus* spp; Asia; Not native to North America: Report! ..... *auriventris* Jendek (citrus flathead borer) (other Asian species or species of eastern North American may key here: *subcinctus* and *lecontei*)

Elytra with at most 8 maculations and without pale band near elytral apex nor a pale band on the basal elytral suture, if pale band present, then few or no spots ..... 6



*A. auriventris*

Image by Daniel Mietchen from Wiki Commons



Image from Jendek and Grebennik 2011



*A. lecontei*, native to eastern North America





6 (5)



Elytron with broad areas of pale setae basally and apically; distinct spots not present; 4-6mm; *Vitis* spp. and *Pistacia* spp.; European species found in NY in 1941 and Oregon in 2025. Pest not known from most of western US: Report! .....*derasofasciatus* LaCordaire (vine borer)

Elytron with humeral spot only, various spots or bands, or elytra immaculate ..... 7



Large patches of pale setae

*A. derasofasciatus*



Photo by Steve Hall  
Oregon Department of Agriculture

# 7 (6)



Pronotum and elytra green without pale setal patches; head deeply impressed medially; 8-14mm; ash, olive, and white fringetree; Asian species introduced to eastern North America and CO, OR, and BC in western US.

.....*planipennis* Fairmaire (emerald ash borer)

Both pronotum and elytra not distinctly green; if head impressed, coloration not green ..... 8



*Aplanipennis*



*lacustris*



*cuprescens*



*acutipennis*



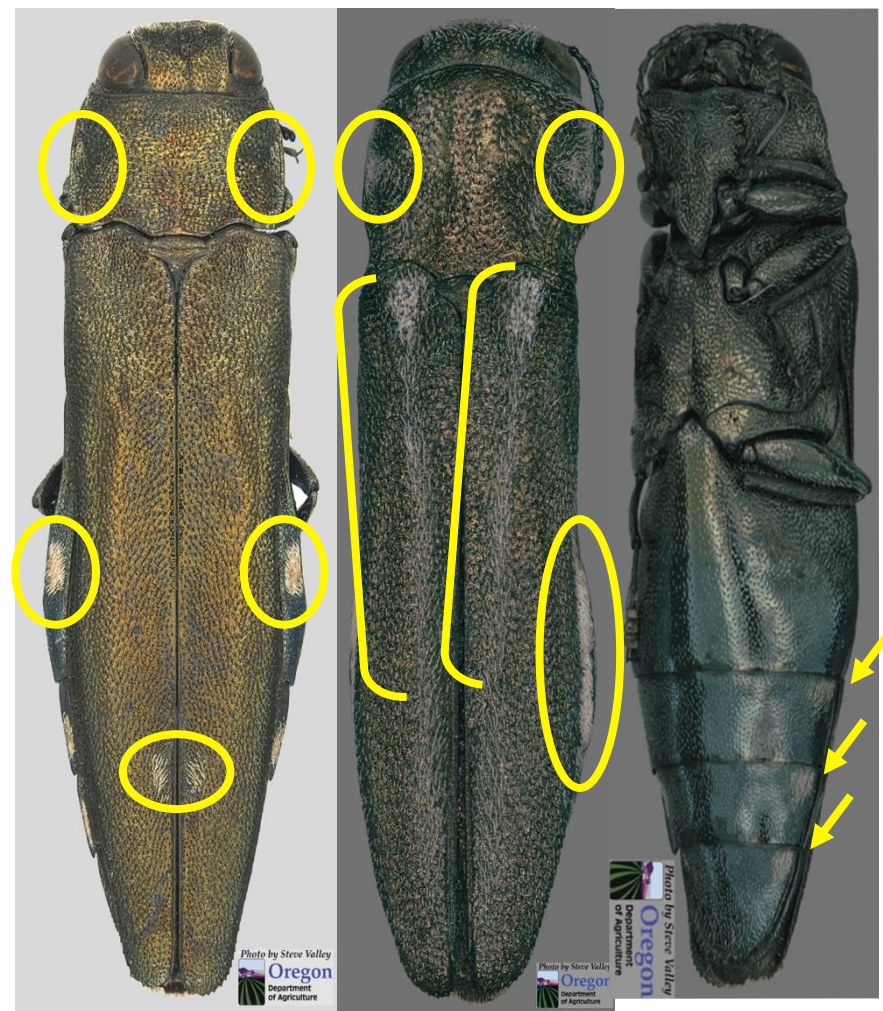
8 (7)



Pronotum, elytra, lateral portions of tergites and sternites or at least one of these body parts with pubescent pale (white, cream, yellow or amber) patches or stripes, cannot be pronotum alone ..... 9



Neither dorsal or ventral surfaces with distinct pubescent pale patches nor stripes (pubescence present but scattered) ..... 37





# 9 (8)



Elytra with pubescent stripes near suture (may vary in distinctness or be somewhat incomplete) ..... 10



Elytra without pubescent stripes near suture or only along apical 1/3 ..... 22



Pubescent stripes near suture.

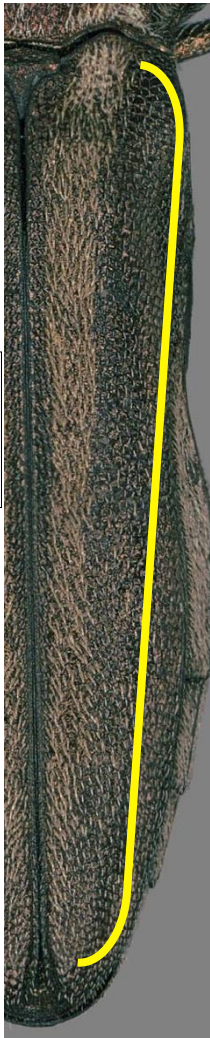


Photo by Steve  
Oreg  
Department  
of Agricult



Photo by Steve  
Oreg  
Department  
of Agricult

No pubescent stripes near suture or only on the apical 1/3.



10 (9)



Pygidium with spine projecting beyond margin .....11

No spine on pygidium ..... 13



*A bilineatus*



*A masculinus*



# 11 (10) part 1 of 2

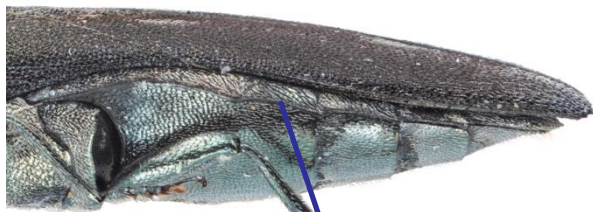
11. Elytral apices angulate with a spine on angle; markings typically as spots; prehumeral carina distinct; lateral abdomen spotted except segment 2; 7.3-12mm; *Populus* spp.; Asia including Russia and eastern Europe. Not native to North America: Report! ..... *fleischeri* Obenberger, China poplar borer

Elytral apices rounded or narrowly rounded, markings typically as continuous stripes; prehumeral carina absent or weak; lateral abdominal spots absent with segment 2 the same; ..... 12



Elytral apex angulate with a spine

*A. fleischeri*



Second segment without pale setal spots



*A. bilineatus*



All lateral sclerites with spots of pale setae

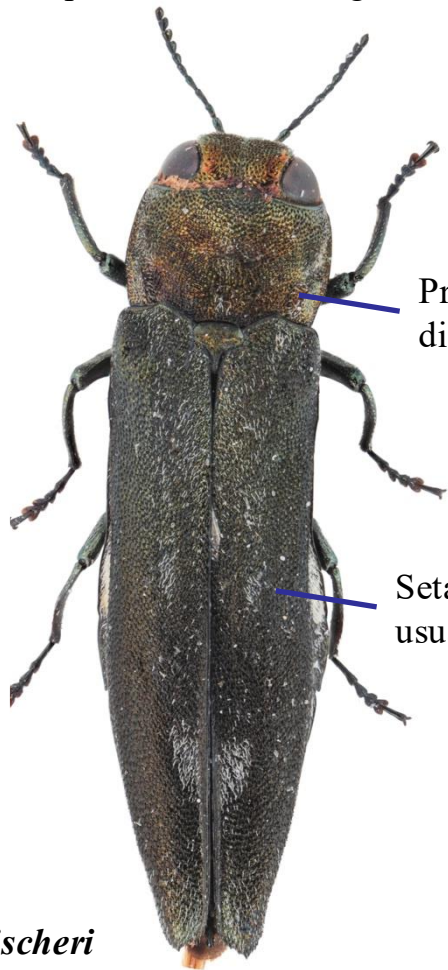
# 11 (10) part 2 of 2

11. Elytral apices angulate with a spine on angle; markings typically as spots; prehumeral carina distinct; lateral abdomen spotted except segment 2; 7.3-12mm; *Populus* spp.; Asia including Russia and eastern Europe. Not native to North America: Report! ..... *fleischeri* Obenberger, China poplar borer

Elytral apices rounded or narrowly rounded, markings typically as continuous stripes; prehumeral carina absent or weak; lateral abdominal spots absent with segment 2 the same; ..... 12



*A. fleischeri*



Prehumeral carina distinct

Setal patches usually as spots



Prehumeral carina weak

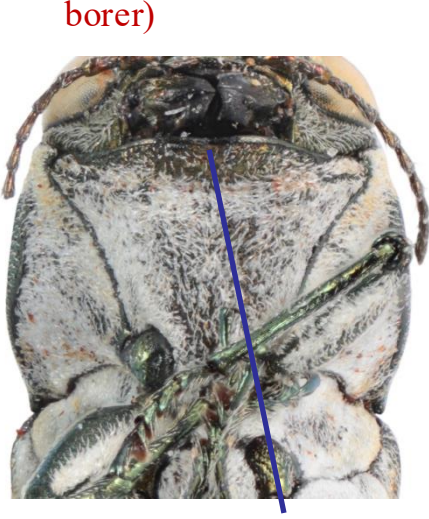
Setal patches usually as stripes

*A. bilineatus*

# 12 (11) part 1 of 2

12. Prosternal lobe emarginate; abdominal spots present; costae weak; 6-9.4mm; host *Salix goodingii*; AZ, CA, NM ..... *fisherianus* Knull

Prosternal lobe straight; abdominal spots absent; no costae; 4.2-9.5mm; hosts *Castanea dentata* and *Quercus* spp.; eastern North America. Not native to western US: Report! ... *bilineatus* (Weber), (two-lined chestnut borer)



Prosternal lobe emarginate



*A. fisherianus*



Spots



Prosternal lobe straight or weakly emarginate



*A. bilineatus*



# 12 (11) part 2 of 2

12. Prosternal lobe emarginate; abdominal spots present; costae weak; 6-9.4mm; host *Salix goodingii*; AZ, CA, NM ..... *fisherianus* Knull

Prosternal lobe straight; abdominal spots absent; no costae; 4.2-9.5mm; hosts *Castanea dentata* and *Quercus* spp.; eastern North America. Not native to western US: Report! ... *bilineatus* (Weber), (two-lined chestnut borer)



*A. fisherianus*



*A. bilineatus*



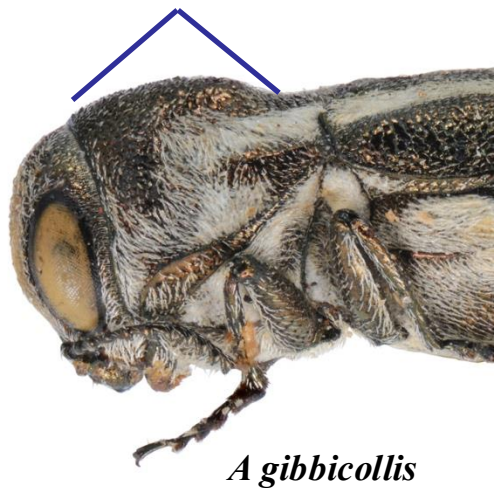


Pronotum raised in a triangular shape anteriorly (gibbose); 4.6-6.6mm; host unknown; AZ, CA, CO, KS, MT, NM, NV, OK, TX, UT, and WY ..... *gibbicollis* Fall

Not raised, or if raised, not in a triangular shape ..... 14



Anterior part of the pronotum swollen



*A gibbicollis*

Pronotum more or less flat

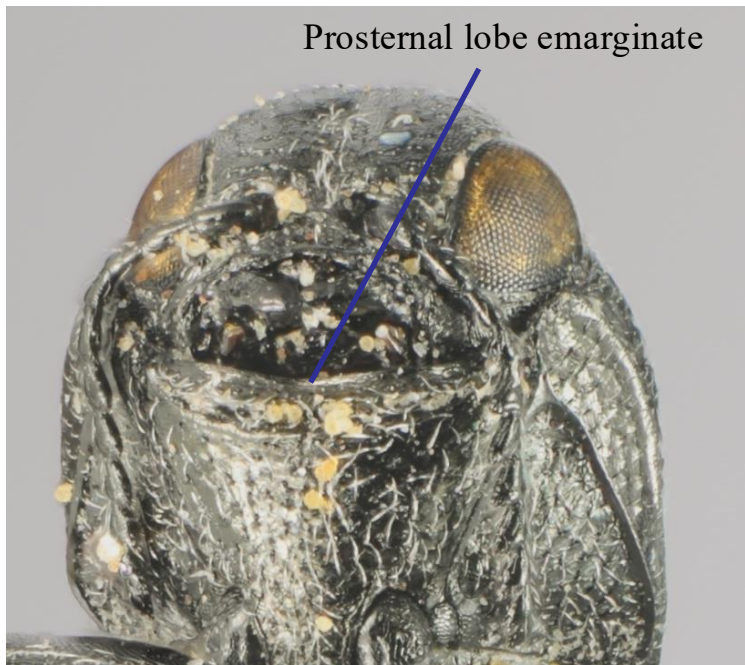


*A masculinus*

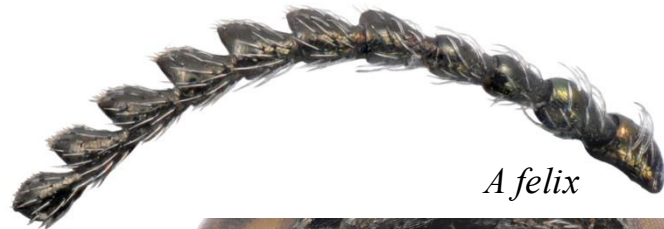
# 14 (13)

14. Antennae serrate from 4; prosternal lobe emarginate ..... 15

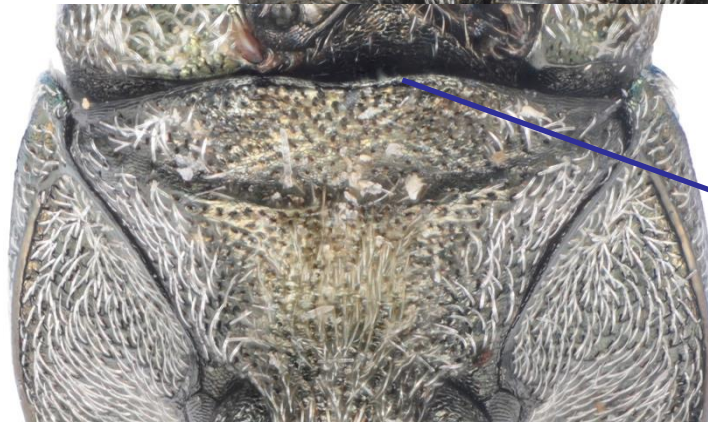
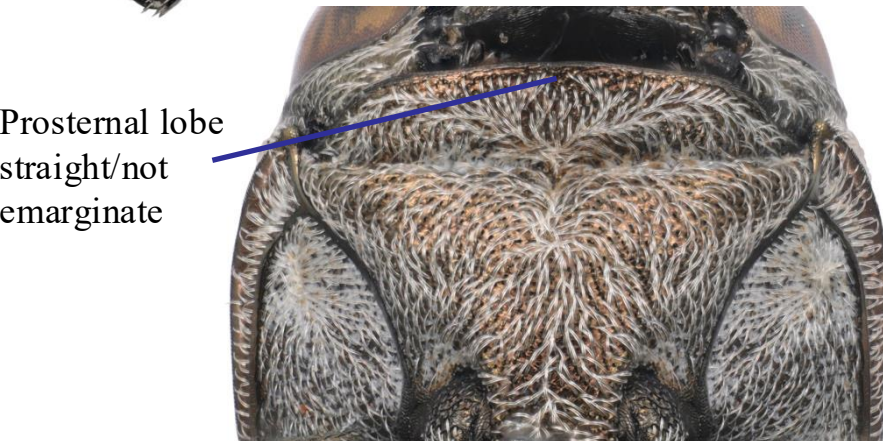
Antennae serrate from 5; prosternal lobe variable ..... 16 



*A ventralis*



Prosternal lobe straight/not emarginate



*A paracelti*

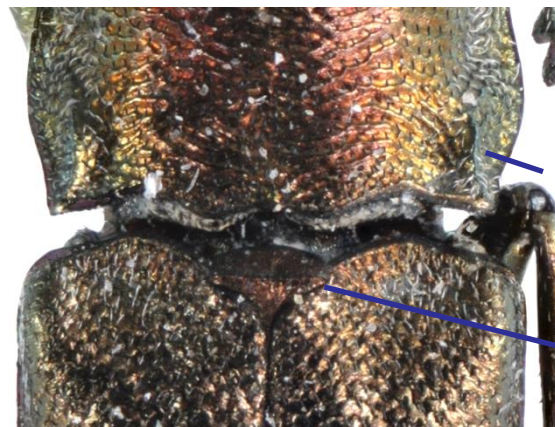
# 15 (14) part 1 of 2

15. Scutellum not carinate; prehumeral carina absent; anterior claws simple, with small tooth; not distinctly bearded (**a, b**); 3.5-4.25mm; host unknown; CA, NE, NM, NV, TX, UT .....*ventralis* Horn

Scutellum carinate; prehumeral carina distinct; anterior claws turned in and touching (or nearly so); bearded; larval host *Acer* spp. and *Aesculus glabra*; 4-6.5mm; eastern species known as far west as MS and TX. Not native to most of western US: Report! ..... *masculus* Horn, (maple *Agrilus*)



Prehumeral carina absent



Prehumeral carina distinct

Carina across scutellum



Claws simple with small tooth

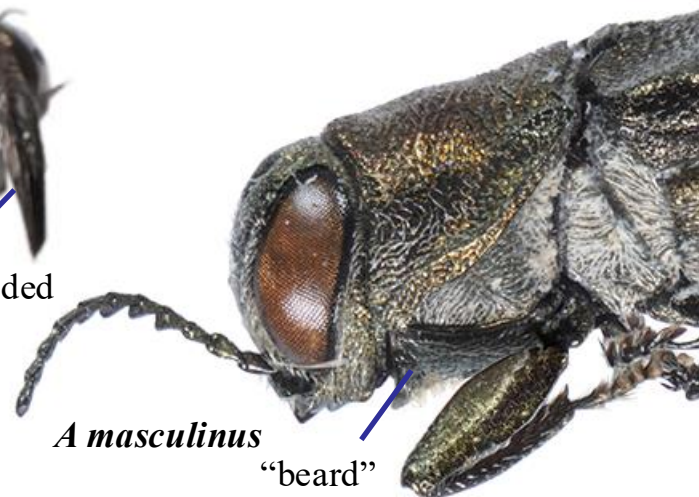


No "beard" although setae present

*A ventralis*



Claws divided



*A masculinus*

"beard"



# 15 (14) part 2 of 2 ■



*A ventralis*

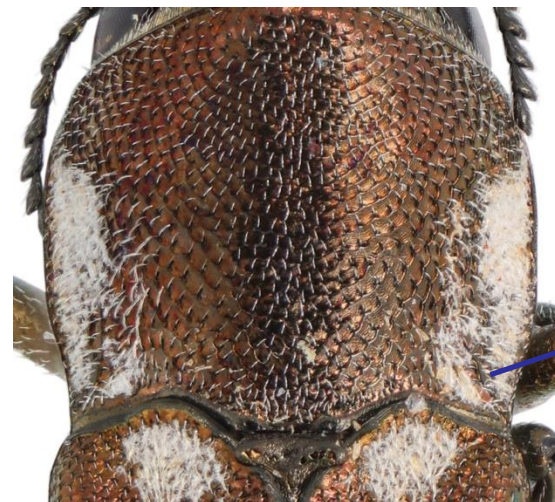


*A masculinus*

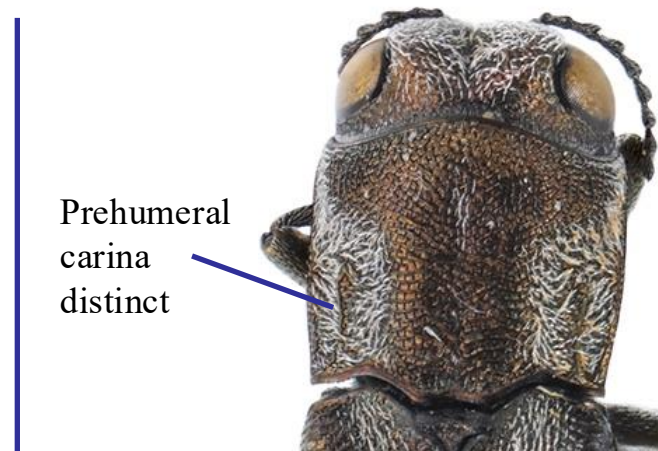


16. Prehumeral carina absent (occasionally very weak, but then asymmetrical or irregular); 4.3-7.5mm; host *Eriogonum elongatum*; CA ..... ***blandus*** Horn

Prehumeral carina present although it may be weak ..... 17



Prehumeral carina absent



Prehumeral carina distinct

*A illectus*



Prehumeral carina weak and irregular

*A blandus*

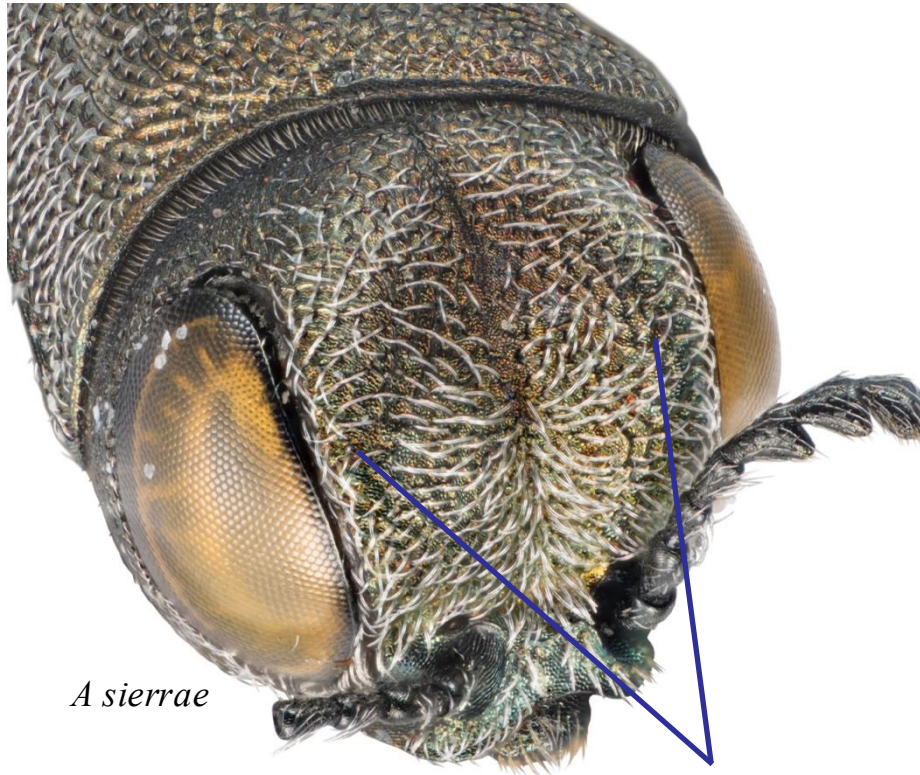


*A sierrae*

# 17 (16)

17. Front of head depressed and concave ..... 18

Front of head convex with at most a thin impression ..... 19



*A sierrae*

Broad depression.



*A felix*

# 18 (17)

18. Pronotum strongly depressed at sides, depressions clothed with distinct, long setae; 5.5mm; host unknown; AZ, CA, NV, and OR ..... *illectus* Fall

Pronotum feebly depressed at sides, without distinct long pubescence; 5.75mm; host unknown; CA .....  
..... *sierrae* Van Dyke



Impressed area

*A illectus*



*A sierrae*





19. Prosternal lobe emarginate ..... 20

Prosternal lobe truncate to weakly emarginate ..... 21



*A. paracelti*



*A. felix*

Emargination weak,  
margin slightly impressed

# 20 (19) part 1 of 2

20. With protuberant pronotum (swollen); stripes fairly strong; With abdominal spots blending to pale apical segments; usually with a greenish or red-copper metallic luster visible to the naked eye; larger, 6.75mm; larval host unknown; AZ, CA, CO, KS, MT, NM, SD, TX, UT, WY, and AB ..... *malvastri* Knull

With relatively flat pronotum; stripes usually weak; abdominal spots absent; usually appear black to the naked eye; smaller, 4.5mm; larval host *Celtis* spp.; species of eastern North America. Not known from western US: Report! ..... *paracelti* Knull



**Anterior pronotum swollen, results in a peak near middle of pronotum**



**Anterior pronotum not swollen, essentially flat in lateral view**



# 20 (19) part 1 of 2



20. With protuberant pronotum (swollen); stripes fairly strong; With abdominal spots blending to pale apical segments; usually with a greenish or red-copper metallic luster visible to the naked eye; larger, 6.75mm; larval host unknown; AZ, CA, CO, KS, MT, NM, SD, TX, UT, WY, and AB ..... *malvastri* Knull

With relatively flat pronotum; stripes usually weak; abdominal spots absent; usually appear black to the naked eye; smaller, 4.5mm; larval host *Celtis* spp.; species of eastern North America. Not known from western US: Report! ..... *paracelti* Knull



*A malvastri*



*A paracelti*

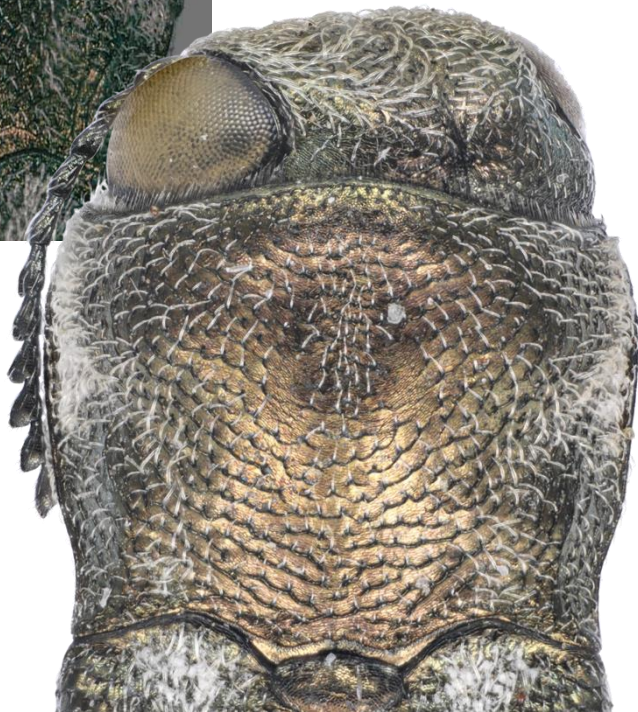


# 21 (19) part 1 of 2



21. Pronotum weakly rugose; abdomen with pale abdominal spots becoming pale segments posteriorly; 6-7.2mm; host *Chrysothamnus* spp.; ID and OR ..... *pubifrons* Fisher

Pronotum distinctly rugose; abdomen with even pale setae; 4.5-6mm; hosts *Grayia* spp. and *Atriplex* spp.; ID ..... *felix* Horn





# 21 (19) part 2 of 2

21. Pronotum weakly rugose; abdomen with pale abdominal spots becoming pale segments posteriorly; 6-7.2mm; host *Chrysothamnus* spp.; ID and OR ..... *pubifrons* Fisher

Pronotum distinctly rugose; abdomen with even pale setae; 4.5-6mm; hosts *Grayia* spp. and *Atriplex* spp.; ID ..... *felix* Horn



Pale spots



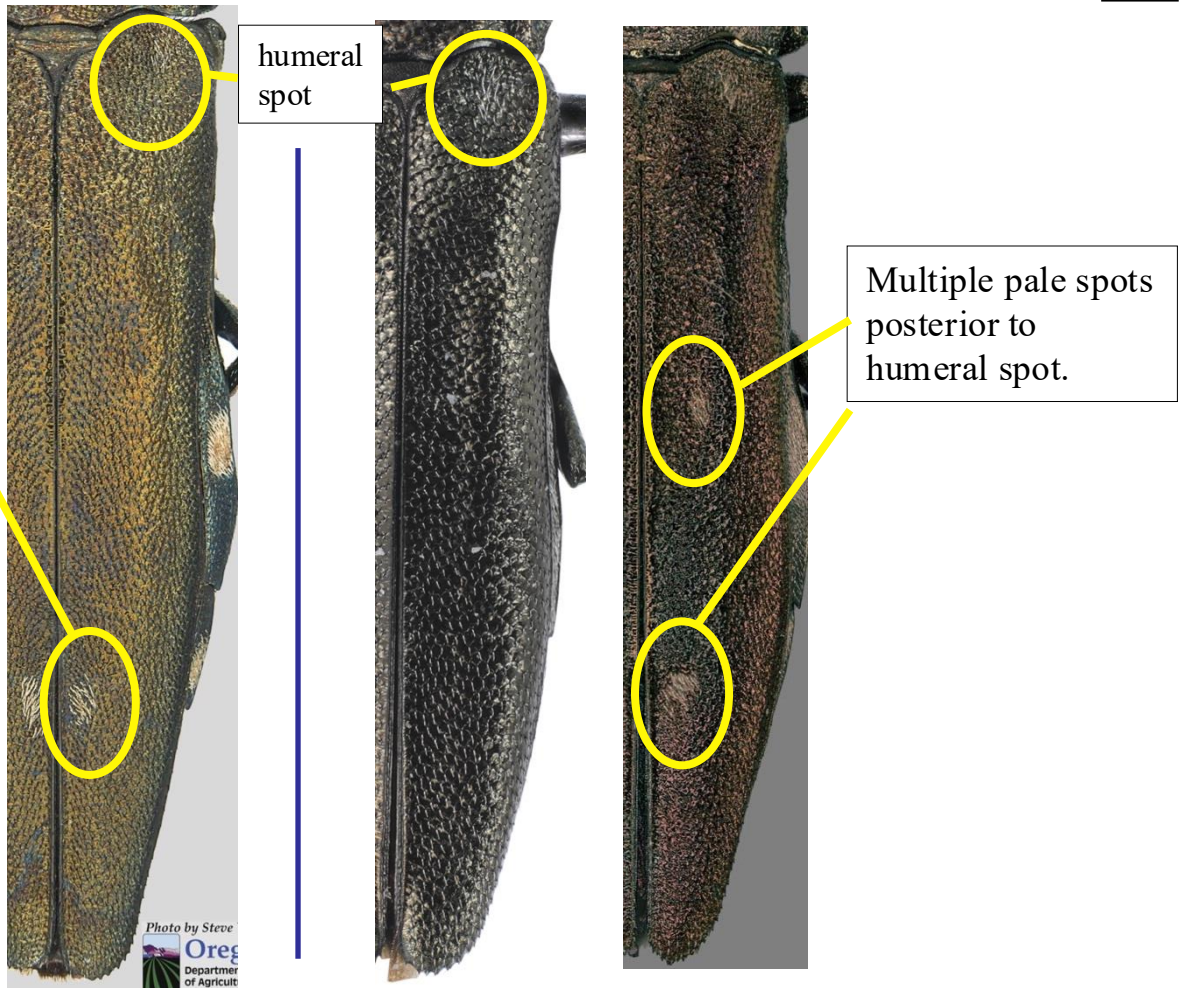


# 22 (9)

Elytron with a single pale spot posterior to the pale spot on the humerus (both spots may be somewhat vague)

..... 81

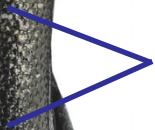
Eltra with other patterns of spots..... 23





With one elongate spot at 2<sup>nd</sup> fourth of elytra (anterior to middle) and humeral spot; 3.5-5.5mm; rare form of a species of eastern US that attacks *Robinia* spp. Not native to western US: Report! .....*egenus* Gory

With color pattern other than above ranging from humeral spot only, multiple pale elytral spots, or large areas of setae not as spots ..... 24



Elongate pale band (often faint)

*A egenus*



*A egeniformis*



*A palmerleei*



*A paracelti*



# 24 (23)

Elytron with other setal patterns including humeral spot only or large areas of pale setae not as discrete spots .....25

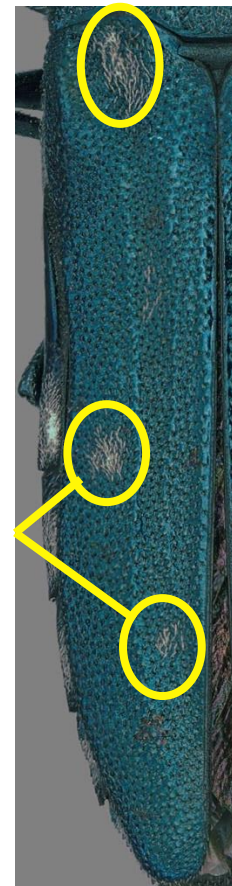
Elytron with 2 or 3 pale spots posterior to the pale spot on the humerus (the humeral spot may be somewhat vague)..... 26



*A palmerleei*



*A paracelti*





# 25 (24)

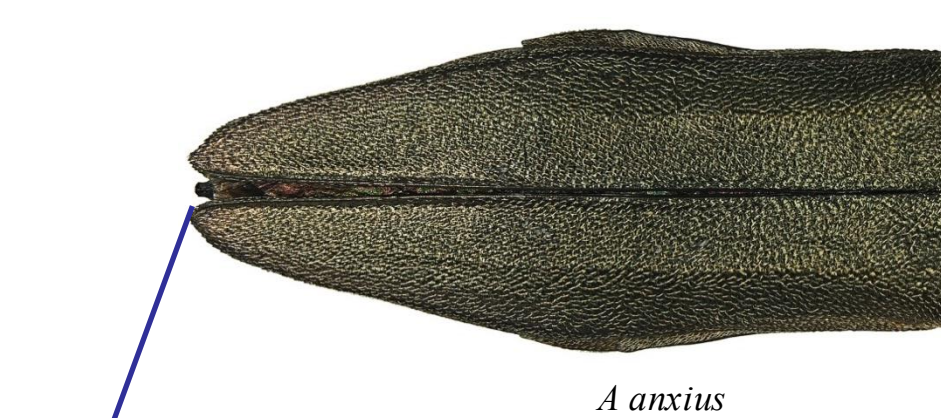
No pygidial spine ..... 42



Pygidium with spine ..... 63

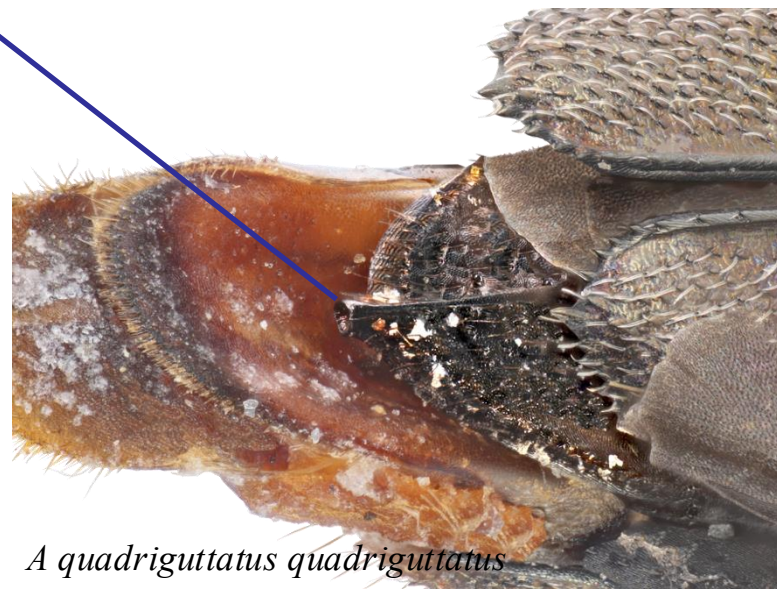


*A. difficilis*



*A. anxius*

Present



*A. quadriguttatus quadriguttatus*



26. Pygidium with projecting spine; apices often acute (sometimes rounded in *A. g. populi*) ..... 27

No pygidial spine; elytral apices rounded ..... 28



*A quadriguttatus quadriguttatus*



*A granulatus populi*

*A mali* male





*A walsinghami*



*A mali* female

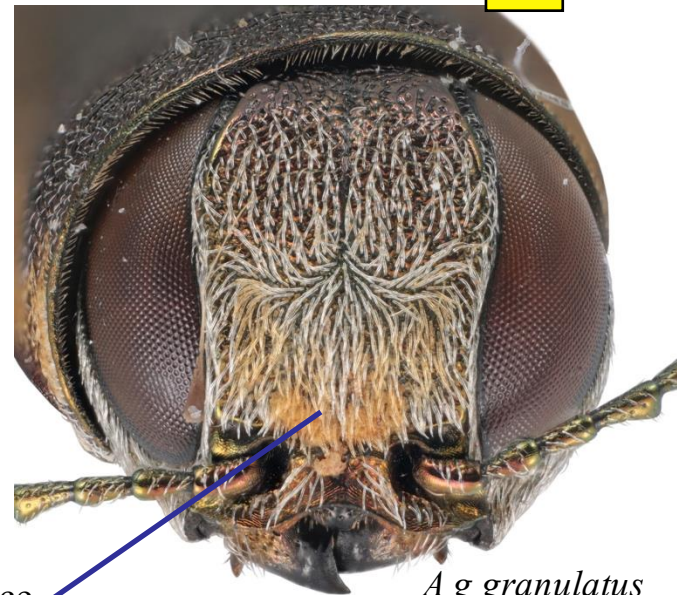
# 27 (26)

27. Frons with setae not obscuring surface .....35 

Frons with dense setae at least partially obscuring surface .....36 



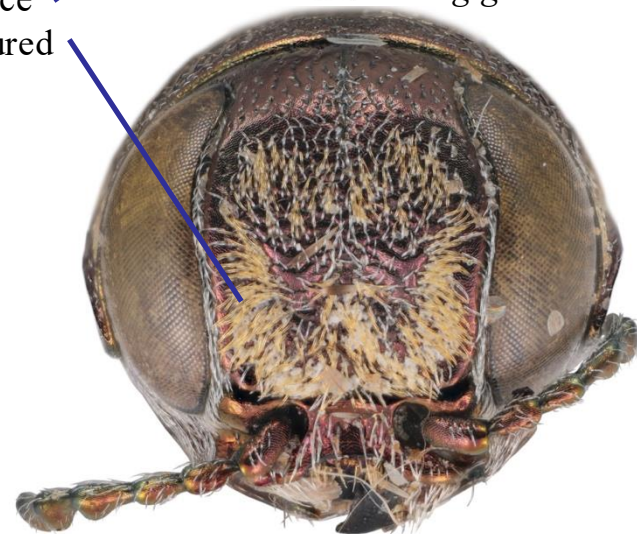
*A q. quadriguttatus*



*A g granulatus*



*A fleischeri*



Surface obscured



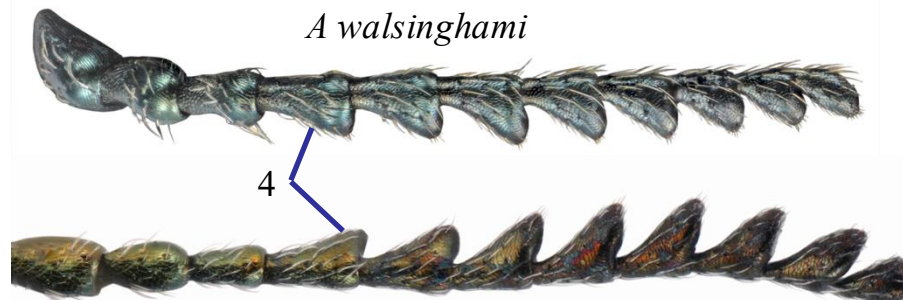
28. Antennae serrate starting at 5; prosternal lobe variable; 7.5mm or less ..... 29

Antennae serrate starting at 4; prosternal lobe emarginate. 4-13mm ..... 32 

*A paraimpexus*



*A walsinghami*



*A mali* male



*A egenus*



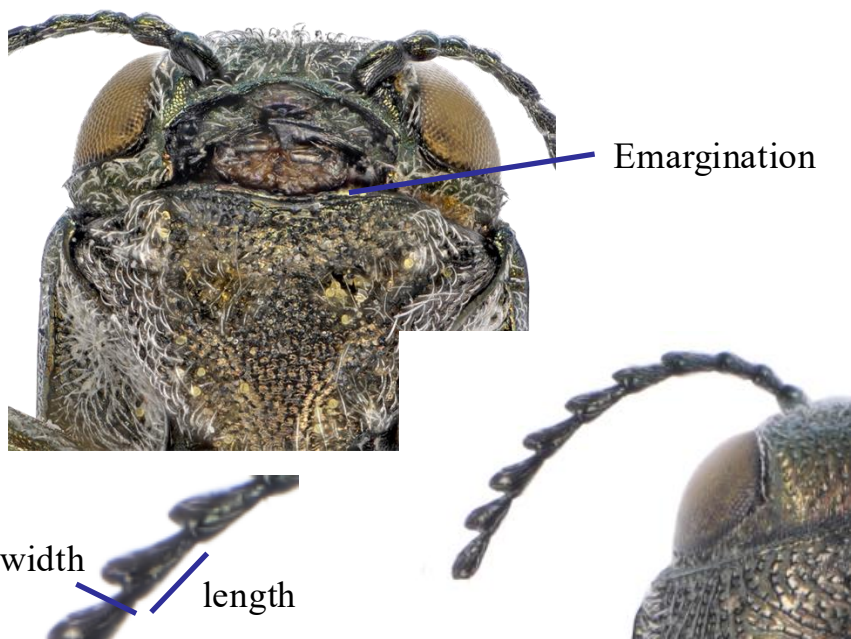
*A walsinghami*



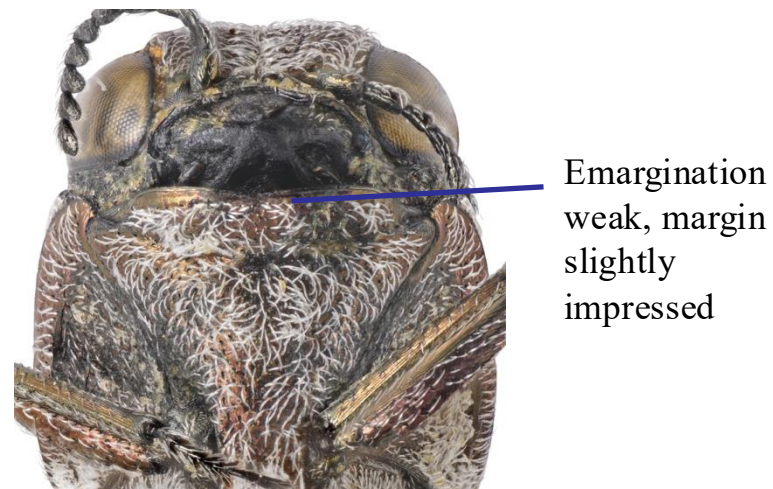
# 29 (28)

29. Prosternal lobe emarginate; outer antennal segments longer than wide; ventral abdominal spots absent; 3.75-5.5mm; species of eastern North America. ....30

Prosternal lobe truncate or weakly emarginate; outer antennal segments subequal or wider than long; ventral abdominal spots often present and distinct; 3.7-8mm.....31



*A. egenus*



*A. paraimpexus*



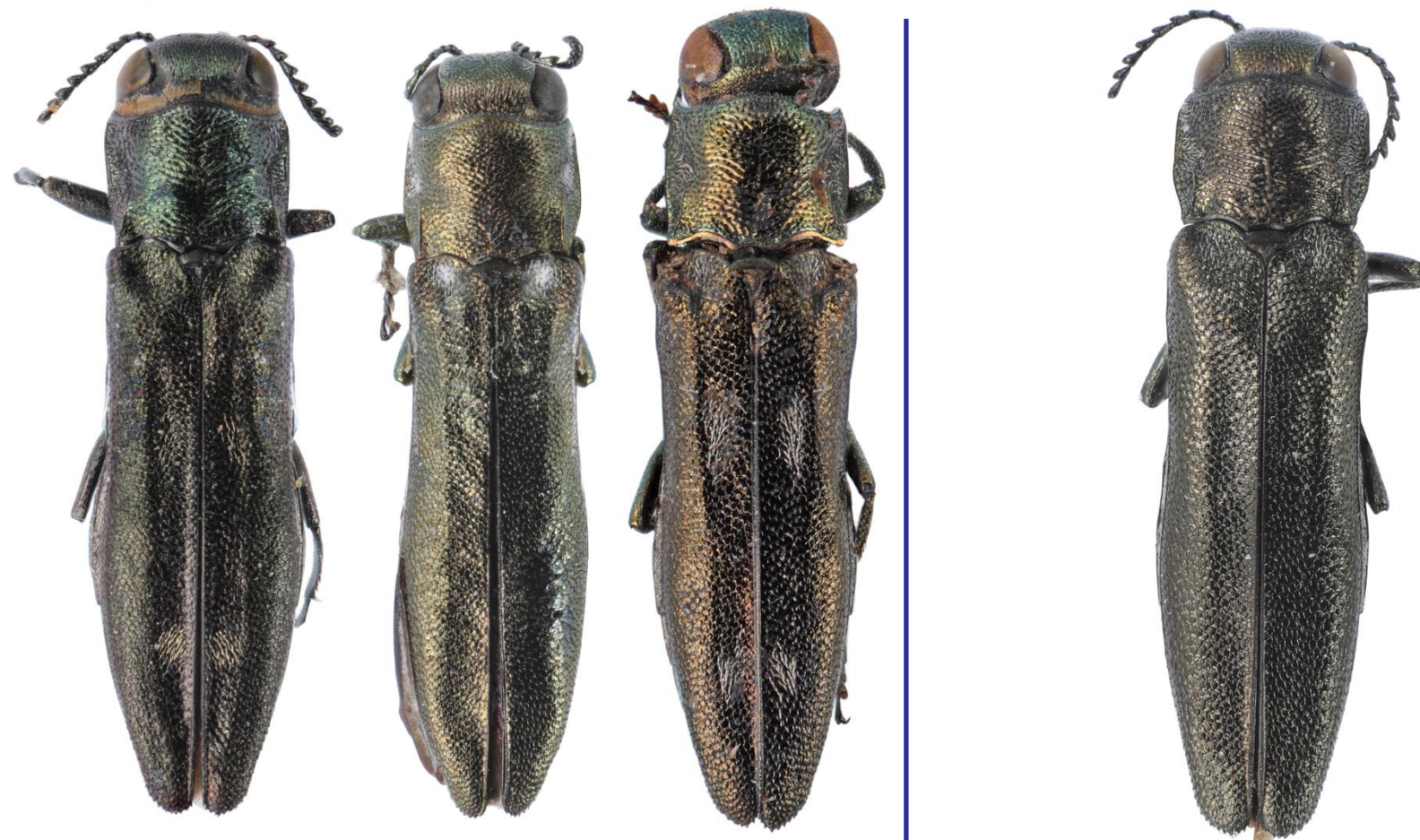
Spots

# 30 (29)

30. Examination of genitalia may be required

Often has distinct spots; 3.75-4.75mm; larval hosts *Gleditsia triacanthos* and *Sapindus saporaria*; eastern North America to NM ..... *egeniformis* Champlain and Knull

Less likely at this couplet, as its spots are typically absent or faint; larval host *Robinia* spp.; 3.5-5.5mm; eastern North America to SD and NM ..... *egenus* Gory



*A. egeniformis*

*A. egenus*



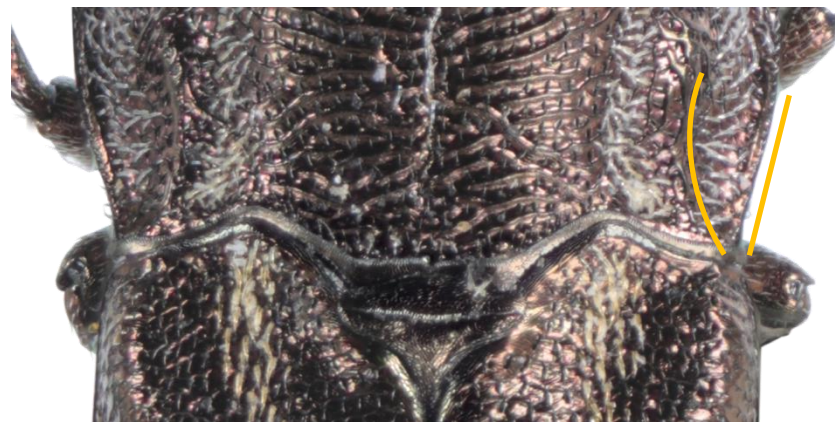
# 31 (29) part 1 of 2

31. Larger: 6.5-7.5mm; prehumeral carinae straighter and more parallel to the marginal carinae; typically black with green reflections; host unknown; SD and MN to MS and AZ ..... *impexus* Horn

Smaller: 3.7-6.7mm; prehumeral carinae more curved and diverging from lateral carina; typically red-brown; hosts *Ditaxis brandegeei* and *Hoffmanseggia jamesii*; AZ, CA, and NM ..... *paraimpexus* Hesperheide



Prehumeral carina straight



Prehumeral carina curved

# 31 (29) part 2 of 2

31. Larger: 6.5-7.5mm; prehumeral carinae straighter and more parallel to the marginal carinae; typically black with green reflections; host unknown; SD and MN to MS and AZ ..... *impexus* Horn

Smaller: 3.7-6.7mm; prehumeral carinae more curved and diverging from lateral carina; typically with red-brown color; hosts *Ditaxis brandegeei* and *Hoffmanseggia jamesii*; AZ, CA, and NM ..... *paraimpexus* Hesperheide




*A. impexus*

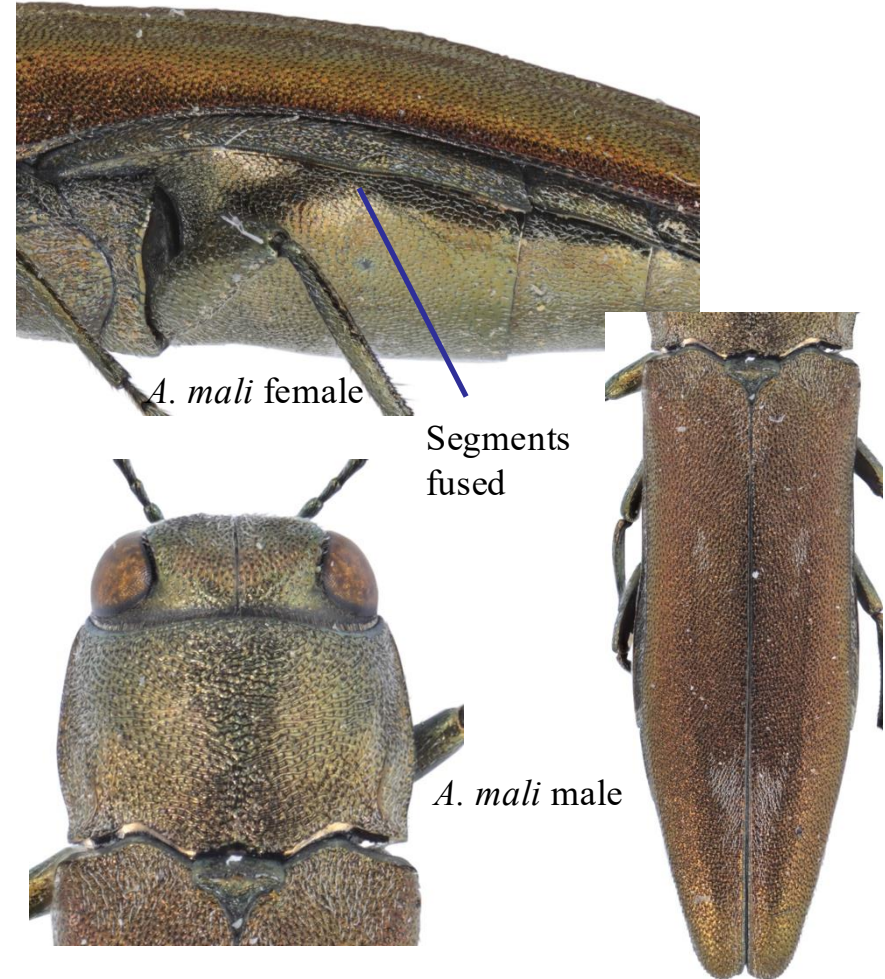
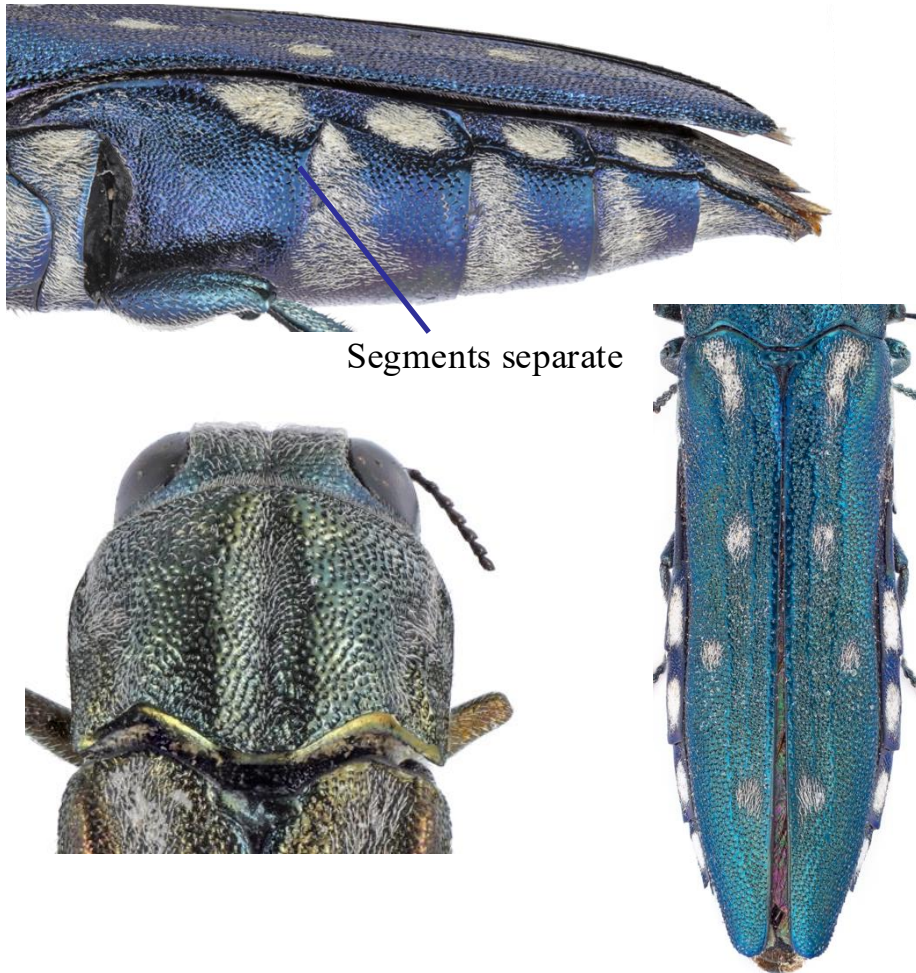


*A. paraimpexus*

# 32 (28) part 1 of 2


32. Abdominal segments 1 and 2 separate laterally; elytra with distinct costae; prehumeral carina variable but usually indistinct; 9-13mm; *Chrysothamnus nauseosus*; western N. America to AZ and NM ..... **walsinghami**  
Crotch

Abdominal segments 1 and 2 fused laterally; elytra usually without distinct costae; prehumeral carina usually distinct ..... 33 



# 32 (28) part 2 of 2

32. Abdominal segments 1 and 2 separate laterally; elytra with distinct costae; prehumeral costae variable but usually indistinct; 9-13mm; *Chrysothamnus nauseosus*; western N. America to AZ and NM ..... *walsinghami*  
Crotch

Abdominal segments 1 and 2 fused laterally; elytra usually without distinct costae; prehumeral costae usually distinct ..... 33 





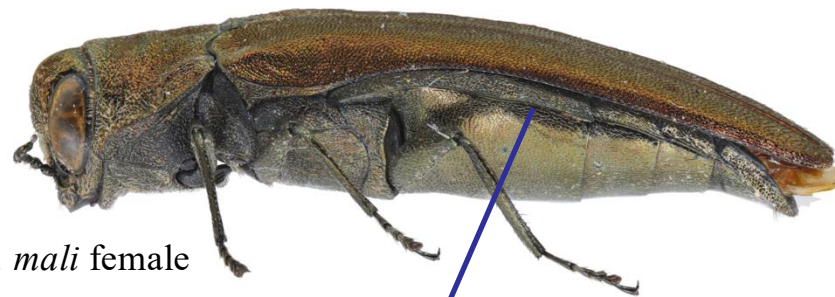
# 33 (32) part 1 of 2

33. Lateral abdominal sclerites with spots except for 2<sup>nd</sup> ; 4.7-8mm; *Fagus grandifolia*, *Carpinus caroliniana*, *Ostrya virginiana*, *Quercus rubra*, *Hicoria* spp., and *Betula* spp.; eastern N. America to southeast TX. Not native to most of western US: Report! ..... *obsoletoguttatus* Gory

If lateral abdominal spots present then also on 2<sup>nd</sup> ..... 34

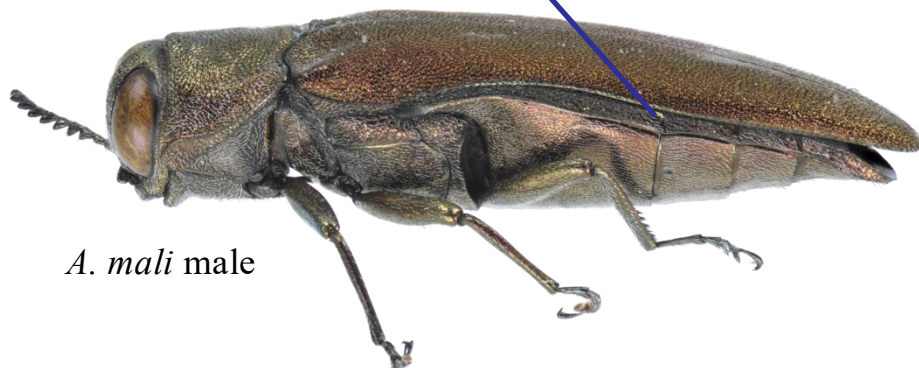


Lateral sclerites of 2<sup>nd</sup> segment mostly bare



*A. mali* female

Lateral sclerites of 2<sup>nd</sup> segment with the same setal ornamentation as other segments



*A. mali* male



# 33 (32) part 2 of 2 ■



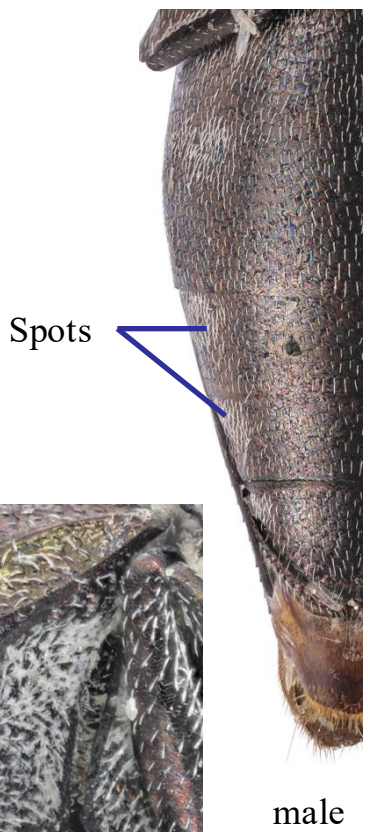
*obsoletoguttatus* Gory



# 34 (33) part 1 of 2

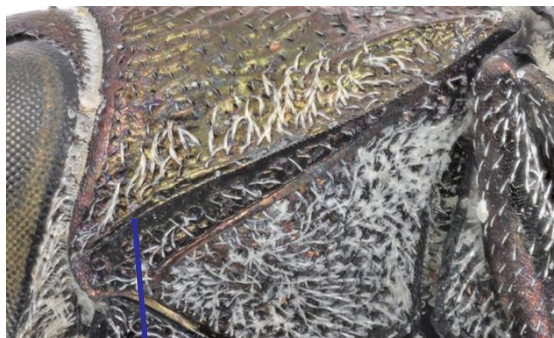
34. Small, 4-5.5mm; space between lateral pronotal carinae smooth on dorsal 1/3 anteriorly; ventral abdomen sometimes with spots (especially males); males with emerald green highlights; host *Gleditsia triacanthos*; eastern N. America to southeast TX. Not native to western US: Report! ..... *fallax* Say

Larger, 6.1-8.7mm; space between lateral pronotal carinae roughly and irregularly sculptured; ventral abdomen without spots; males without dramatic green coloration; hosts *Cydonia oblongata*, *Emmenopterys henryi*, *Malus* spp., *Prunus* spp., *Sorbus* spp.; east Asia to Russia. Not native to North America. Report! ..... *mali* Matsumera



*A. fallax*

male



Smooth in upper 1/3



*A. mali* male

Rough and irregular sculpture



*A. mali* female



*A. mali* male

# 34 (33) part 2 of 2

34. Small, 4-5.5mm; space between lateral pronotal carinae smooth on dorsal 1/3 anteriorly; ventral abdomen sometimes with spots (especially males); males with emerald green highlights; host *Gleditsia triacanthos*; eastern N. America to southeast TX. Not native to western US: Report! ..... *fallax* Say

Larger, 6.1-8.7mm; space between lateral pronotal carinae roughly and irregularly sculptured; ventral abdomen without spots; males without dramatic green coloration; hosts *Cydonia oblongata*, *Emmenopterys henryi*, *Malus* spp., *Prunus* spp., *Sorbus* spp.; east Asia to Russia. Not native to North America. Report! ..... *mali* Matsumera



*A. fallax*



*A. mali* female



*A. mali* male



35. Posterior spots in V-shape, markings bold (sometimes with scattered pale setae basally suggesting a longitudinal stripe); 7.3-12mm; host *Populus* spp.; NE Asia including Russia and eastern Europe. Not native to North America: Report! ..... *fleischeri* Obenberger

Posterior spots not in a V-shape, markings often faint; 7-11mm; *Alnus* spp. and *Salix* spp.; range continental US ..... *quadriguttatus quadriguttatus* Gory



Distinct and V-shaped



*A fleischeri*



*A quadriguttatus quadriguttatus*

female by Jason Hansen,  
<https://bugguide.net/node/view/1890494/bgimage>





36. Elytra dark, with white or golden pubescent spots; 7-11mm; *Populus* spp.; eastern form occurring as far west as MT and OK ..... *granulatus granulatus* (Say)

Elytra coppery to greenish or bluish, often with whitish pubescent spots; 7.5-9.75mm; *Populus* spp.; western form occurring from British Columbia to southwestern Alberta and MT ..... *granulatus populi* Fisher (derived from Bright 1987)





With pygidial spine ..... 38



*A planipennis*

Pygidial spine absent ..... 54



*A sulcicollis*



*A abditus*

# 38 (37)

Elytra distinctly blue; 7.5-10mm; *Quercus* spp.; eastern North America. Not native to western US: Report! ...  
..... *acutipennis* Mannerheim

Elytra not primarily blue ..... 39

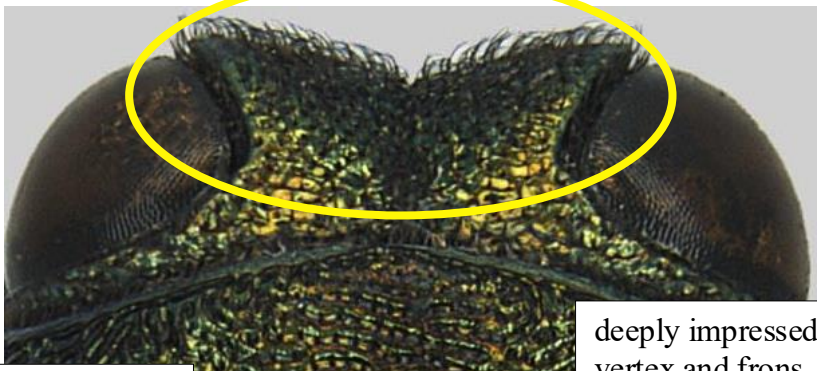


*A planipennis*

# 39 (38)

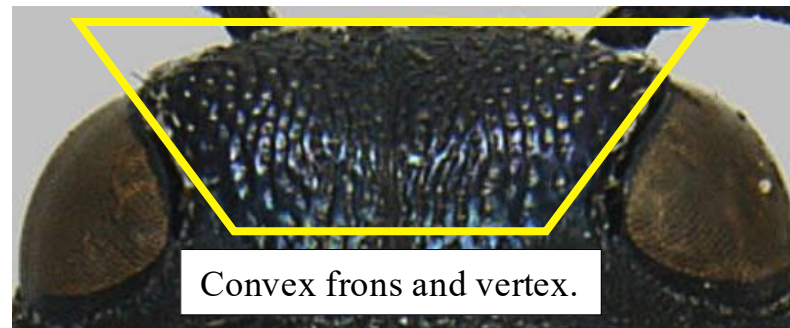
Vertex and frons flat to impressed, deeply impressed and concave dorsally ..... 40

Vertex and frons flat to convex; if flat then dorsal impression small ..... 51 

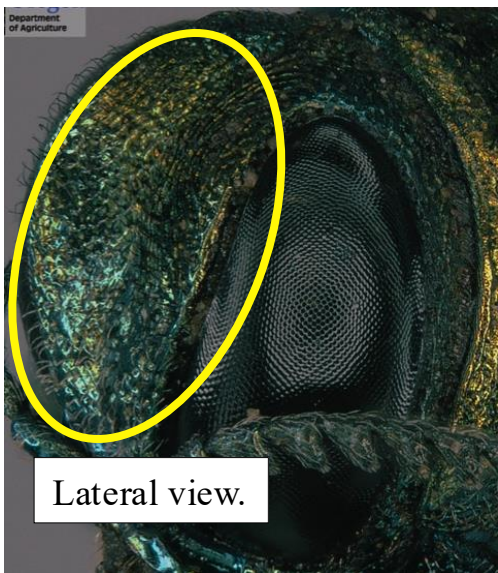


Dorsal view.

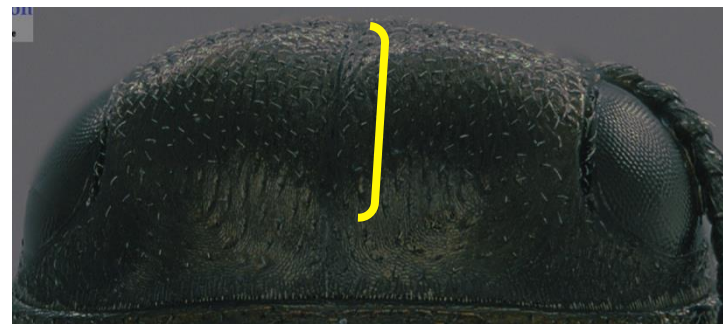
deeply impressed vertex and frons



Convex frons and vertex.



Lateral view.



Finely impressed frons and vertex.

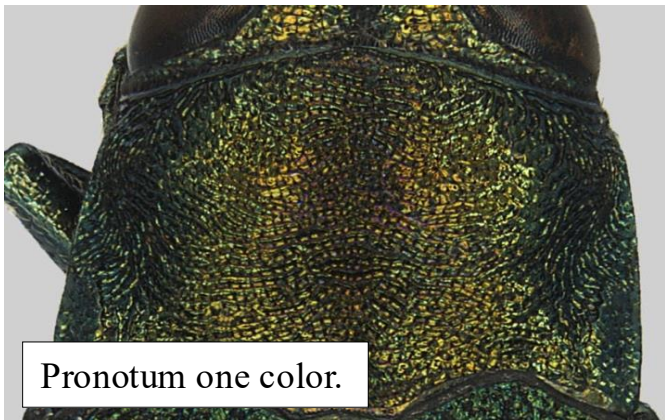


# 40 (39) part 1 of 2

Pronotum usually green, if with reddish coloration then elytra usually green or green-blue rarely with bronze coloration (based on a few preserved specimens); 8-14mm; ash, olive, and whitefringe tree; Asian species introduced to eastern North America and CO, OR, and BC in the West. .... *planipennis* Fairmaire (emerald ash borer)



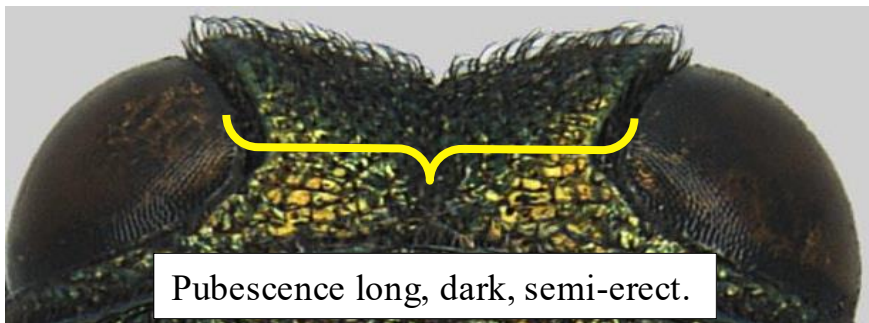
Pronotum red to copper; distinctly bicolored with gray to black elytra ..... 41



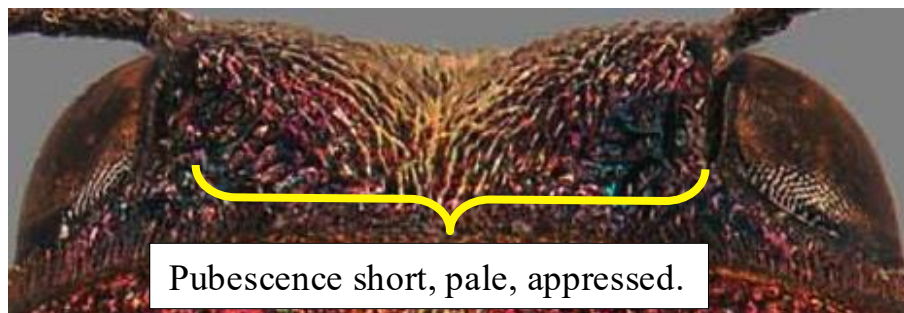
Pronotum one color.



Pronotum multicolored.



Pubescence long, dark, semi-erect.



Pubescence short, pale, appressed.

*Agrilus*  
*planipennis*  
Fairmaire,  
the Emerald  
Ash Borer



Color morph likely caused  
by trap stickum or  
extraction method



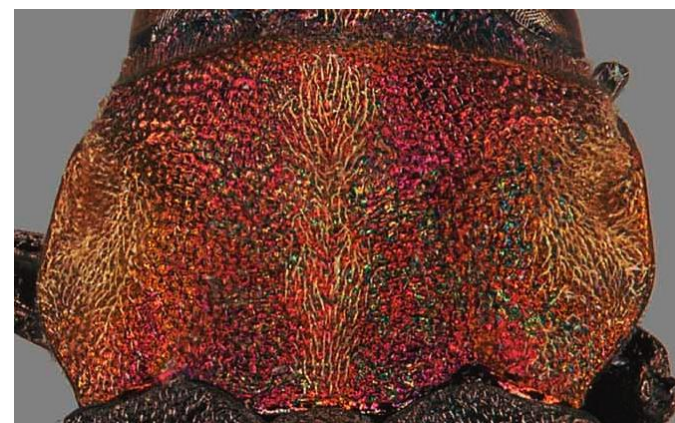
# 41 (40) Part 1 of 2



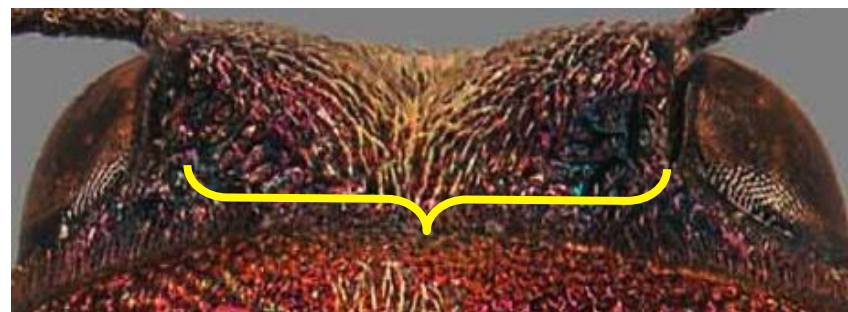
Pronotum all one color, metallic red or bronzy red; from dorsal view, frons with long, dark pubescence; smaller: 4-7mm; *Rubus* spp.; eastern North America to TX introduced to CA. Not in most of the western US: Report!

..... *ruficollis* Fabricius

Pronotum multi-colored due to pigment, with coppery stripes on either side of median line; from dorsal view, frons with short, pale pubescence; larger: 8-9.7mm; *Amelanchier canadensis*, *Crataegus* spp., *Pyrus* spp., *Malus* spp., and *Prunus virginiana*; North America North of Mexico ..... *vittaticollis* (Randall)



Pronotum multicolored.



Pubescence short, pale, appressed.



*A. ruficollis*



*A. vittaticollis*

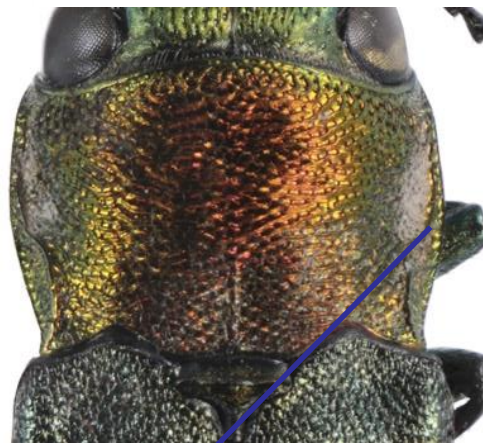




Bicolored, with pronotum reddish coppery and elytra green; prehumeral carina long and sinuate, reaching past middle of pronotum and often near apex; 5.7-8.2mm; host tree of heaven; native to Asia but introduced to CT, NJ, NY, PA. Not native to western US: Report! ..... *smaragdifrons* Ganglebauer (tree of heaven borer)

Unicolorous or, if bicolored not as above; when present, prehumeral carina not reaching middle of pronotum

..... 43



**Prehumeral carina  
extending past middle of  
pronotum**


*A. smaragdifrons*

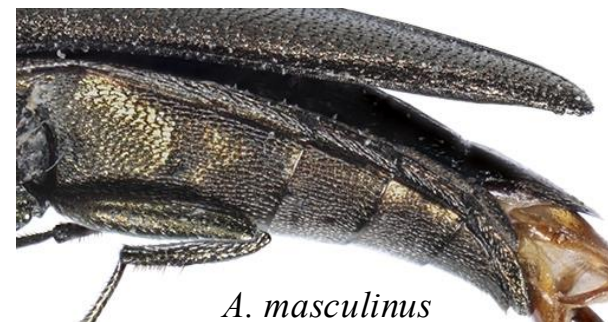
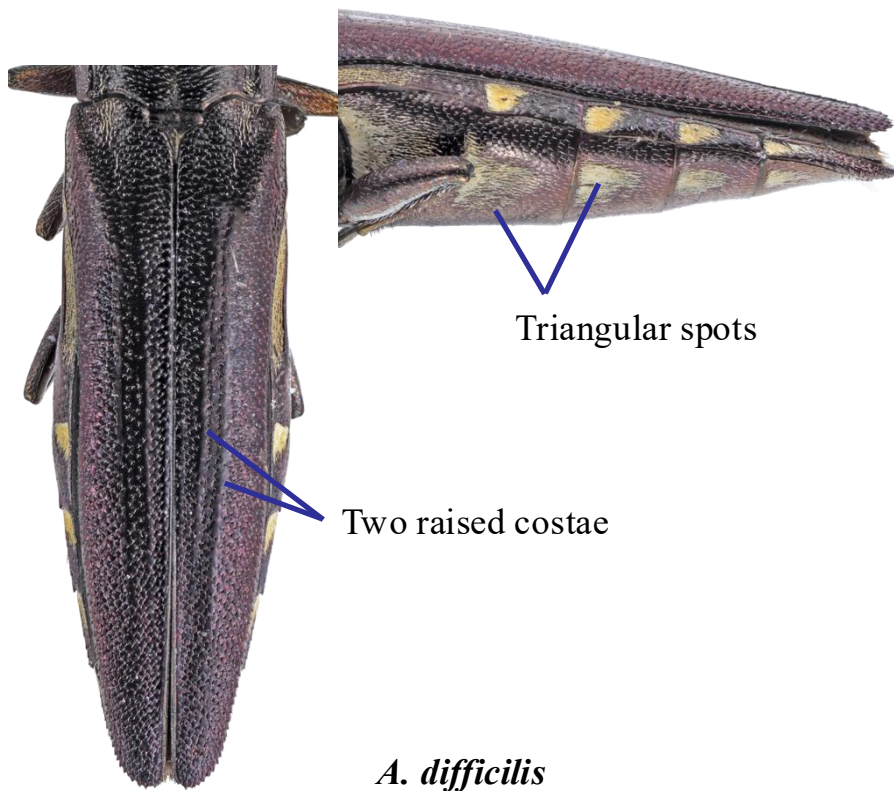


*A. difficilis*

# 43 (42) part 1 of 3

43. Elytra with distinct smooth interstriae usually with 2 or more raised as weak costae; large abdominal spots (usually triangular); prosternal lobe emarginate usually as a distinct medial notch; protarsal claws with medial tooth turned toward middle, but not touching; 7-13mm; host *Gleditsia triacanthos*; Asian species introduced to the eastern US to UT and TX, detected in OR in 2021 ..... *difficilis* Gory (honeysuckle borer)

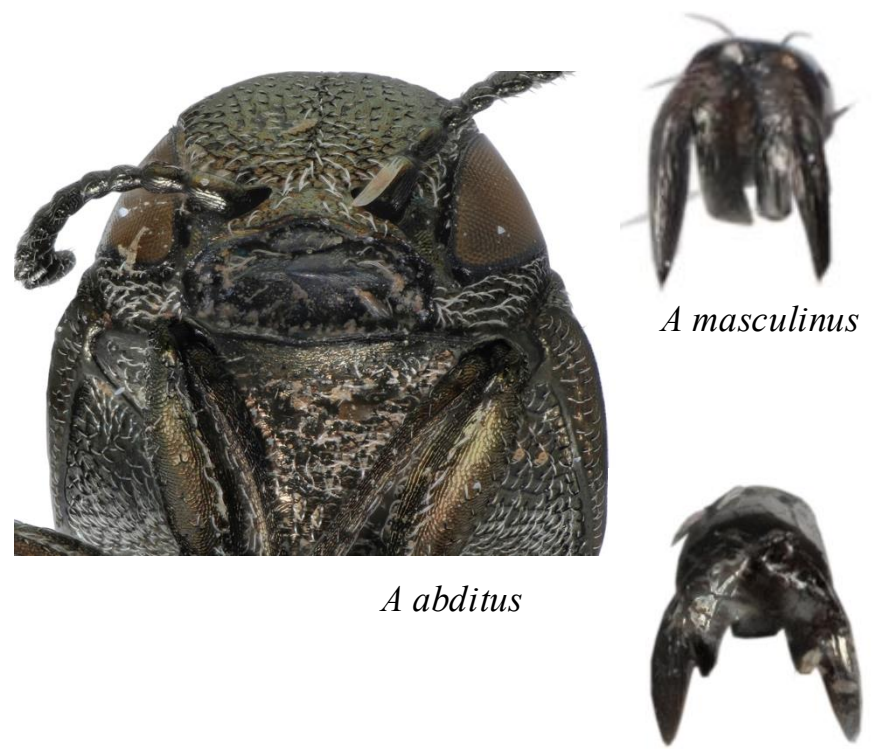
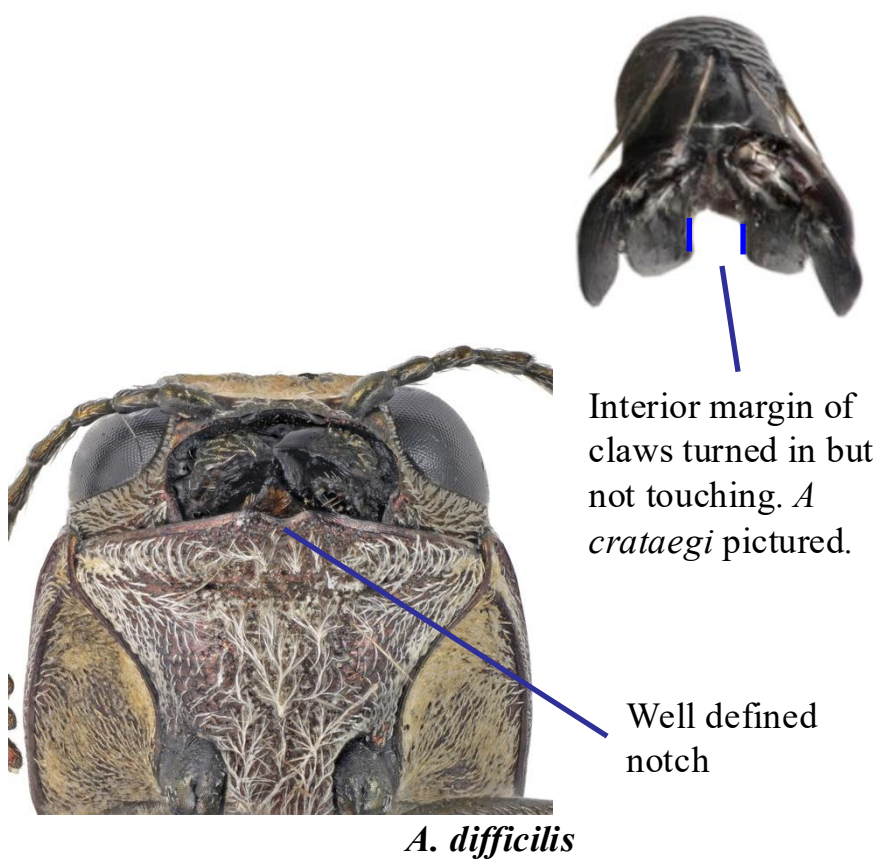
Without distinct , smooth interstriae; no distinct abdominal spots visible from dorsal perspective; prosternum not notched; if protarsal claws with medial tooth turned inwards, then touching (or nearly so) ..... 44 



# 43 (42) part 2 of 3

43. Elytra with distinct smooth interstriae usually with 2 or more raised as weak costae; large abdominal spots (usually triangular); prosternal lobe emarginate usually as a distinct medial notch; protarsal claws with medial tooth turned toward middle, but not touching; 7-13mm; host *Gleditsia triacanthos*; Asian species introduced to the eastern US to UT and TX, detected in OR in 2021 ..... *difficilis* Gory (honeysuckle borer)

Without distinct , smooth interstriae; no distinct abdominal spots visible from dorsal perspective; prosternum not notched; if protarsal claws with medial tooth turned inwards, then touching (or nearly so) ..... 44





# 43 (42) part 3 of 3 ■



*A. difficilis*



44. Prehumeral carina absent; 2.8-4.5mm; host *Acer grandidentatum*; TX ..... *putillus parputillus* Knull

Prehumeral carina distinct; larger than 3.5mm ..... 45



Prehumeral carina absent

*A putillus parputillus*



*A abditus*



# 45 (44)

45. Pronotal median impression present and usually without interruption in the middle of pronotum; prosternal lobe truncate; 4.5-5mm; host *Quercus arizonicus*; AZ, NM, NV..... *abditus* Horn

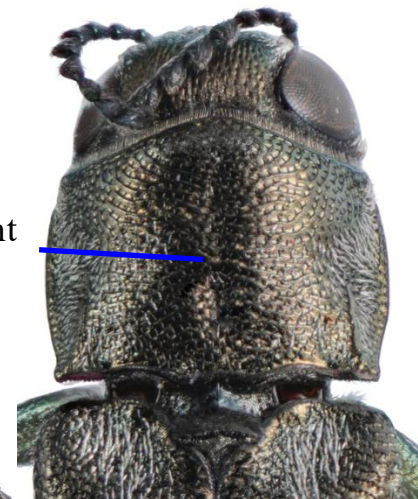
Pronotal median impression variable, although if present then usually interrupted at middle; prosternal lobe emarginate (rarely truncate in *A. politus*) ..... 46



Median impression present and continuous (may be vague at anterior margin)



*A egenus*



*A paracelti*



# 46 (45)

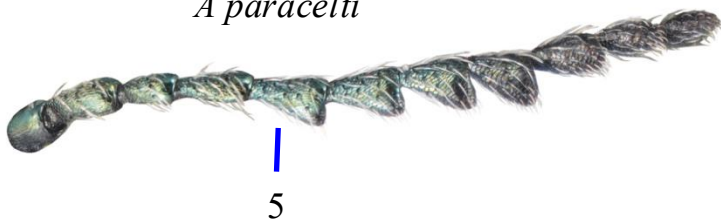


46. Antennae serrate from 5, not native to western North America .....47

Antennae serrate from 4, native species ..... 48



*A paracelti*

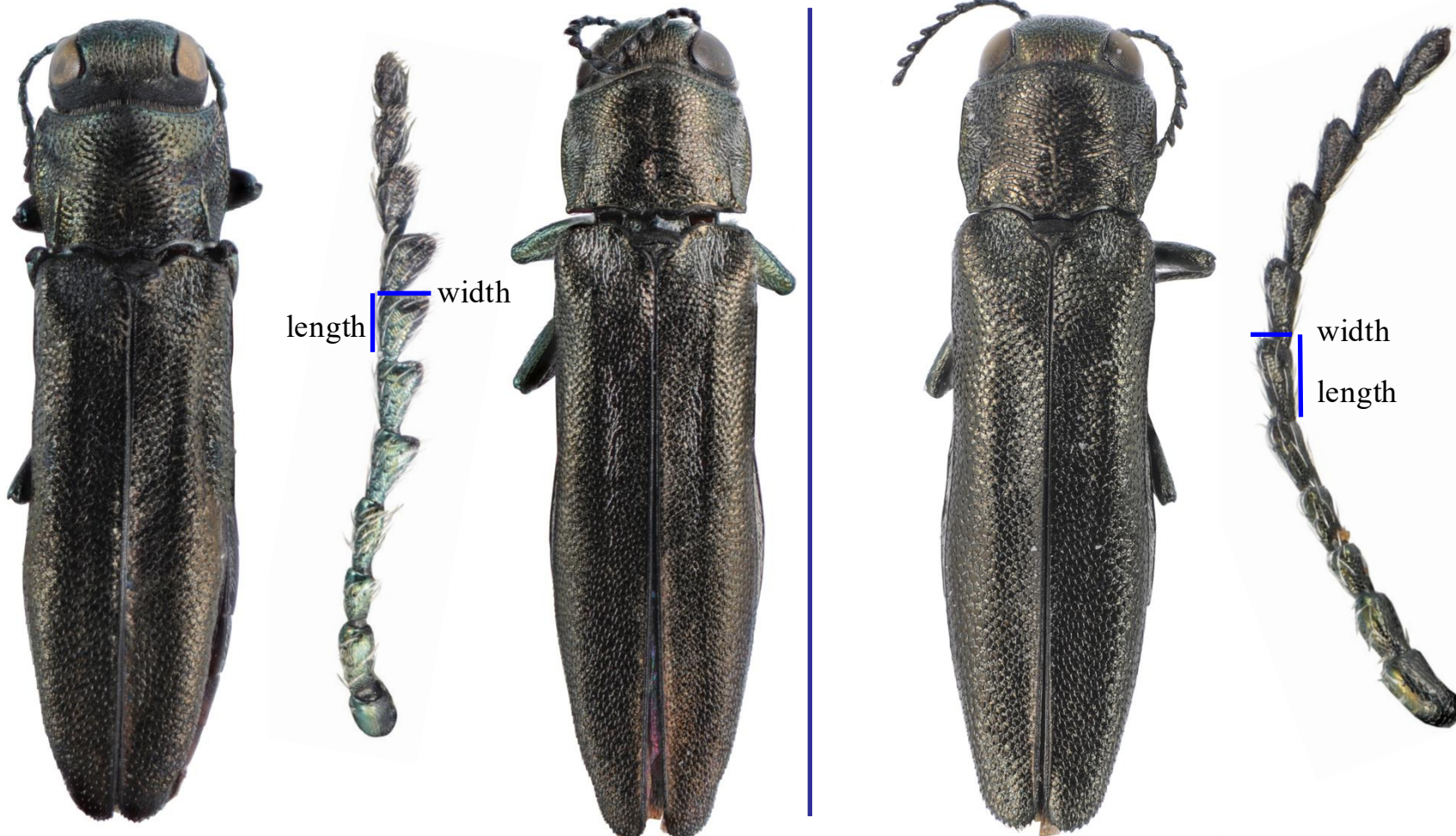


*A masculinus*

# 47 (46)

47. Outer antennal segments less than 1.5 times as long as wide; 4.5-5.8mm; *Celtis occidentalis*; North America to TX and CO. Report! ..... *paracelti* Knull

Outer antennal segments greater than 1.5 times as long as wide; rare form lacking elytral spots beyond humeral; 3.5-5.5mm; *Robinia* spp.; eastern North America to SD and NM ..... *egenus* Gory



*A. paracelti*

*A. egenus*



48. Claws cleft, inner teeth turned in and touching (or nearly so); dense beard; 4-6.5mm; host *Acer* spp. and *Aesculus glabra*; eastern species known as far west as MS and TX ..... ***masculus*** Horn (maple *Agrilus*)

Claws simply cleft and diverging; dense setae may be present on the sternum but not beardlike ..... 49



Touching or nearly so



*A masculinus*




*A politus*



*A palmerleei*

# 49 (48)

49. Bicolored with reddish pronotum and black elytra; prehumeral carina flattened and broadly rounded; 9.5mm; host *Quercus hypoleucoides*; AZ ..... *palmerleei* Knull

Color variable, but if bicolored then dark, coppery pronotum with red copper elytra; prehumeral carina normal; hosts other than oak ..... 50 



*A palmerleei*



*A cephalicus*



*A politus*





# 50 (49) part 1 of 2

Black, blue, green, red copper, or gold, some forms bicolored usually with a bronze pronotum and reddish copper elytra; pronotal rugae smooth and shiny; prosternal lobe truncate to weakly emarginate: 4.7-8.5mm; hosts *Acer* and *Salix* spp.; widespread ..... *politus* (Say) (willow gall limb borer)

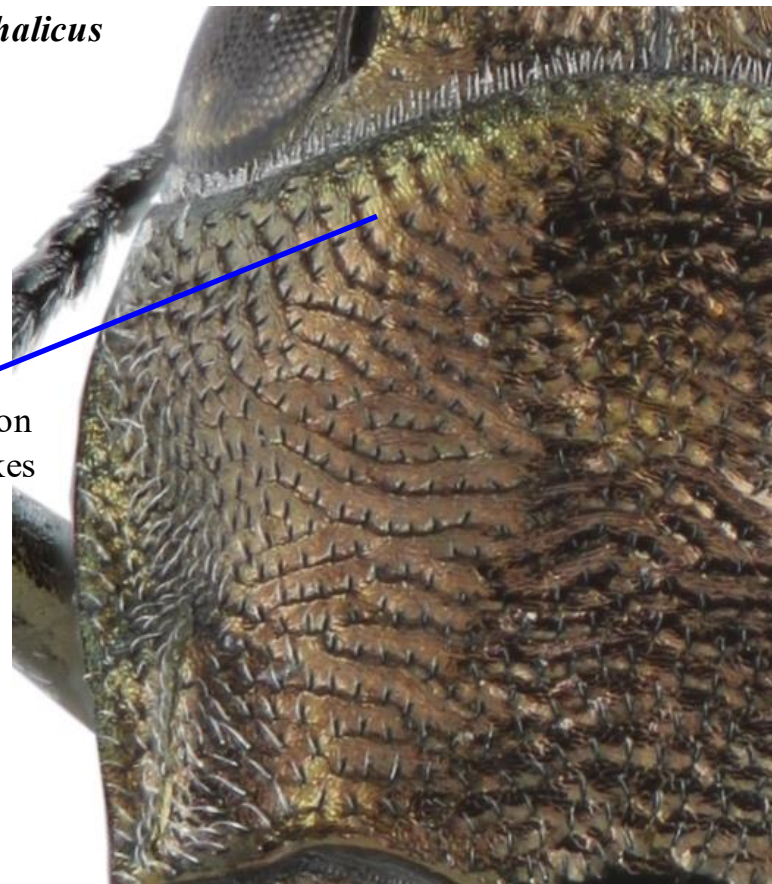
Black to dark bronze, pronotum sometimes paler bronze; pronotal rugae with microsculpture and therefore duller; prosternal lobe always emarginate; 4.5-5.8mm; host *Cornus florida*; species of eastern North America to MI and TX. Not native to western US: Report! ..... *cephalicus* LeConte



*A politus*

*A cephalicus*

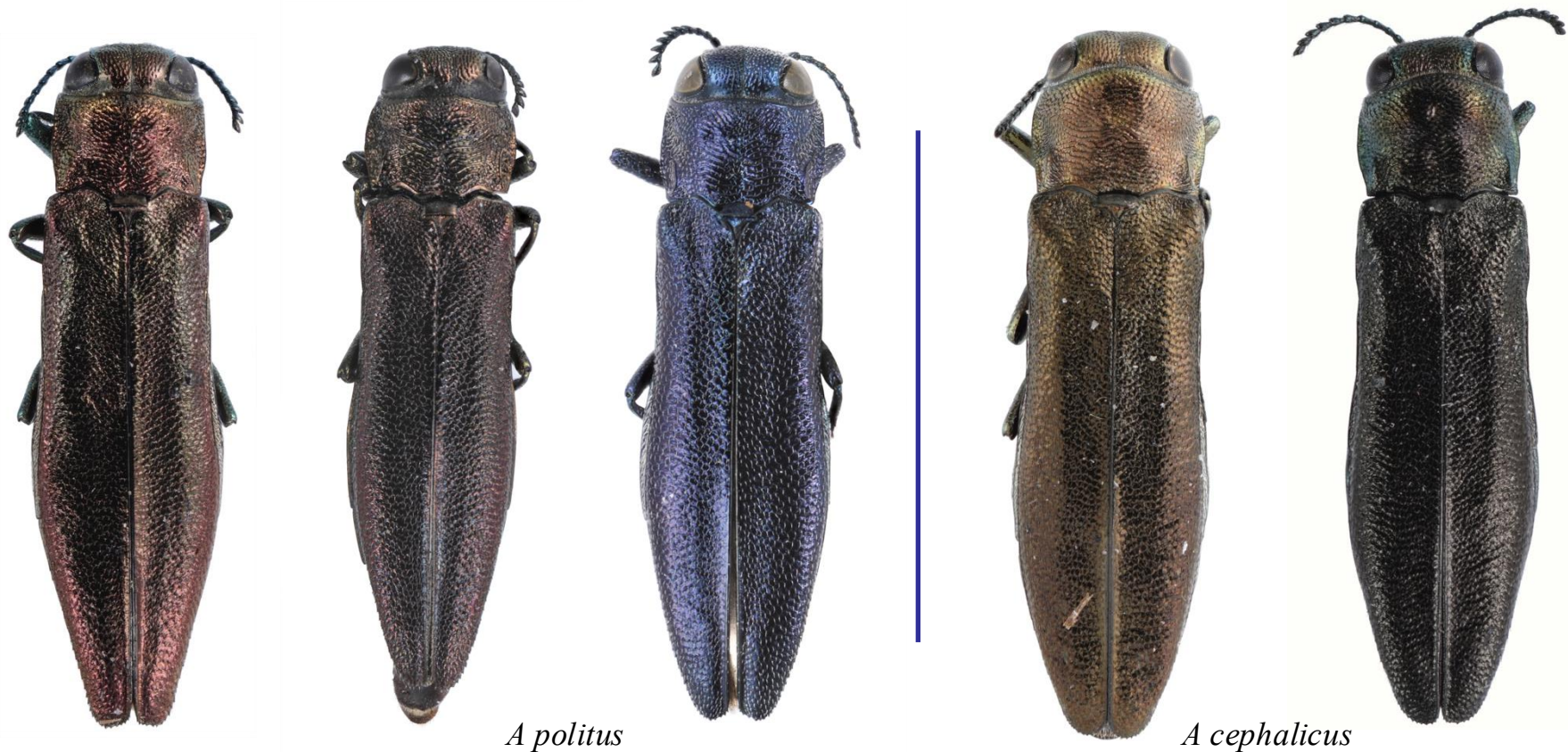
Minute sculpture on rugae makes it appear duller



# 50 (49) part 2 of 2

Black, blue, green, red copper, or gold, some forms bicolored usually with a bronze pronotum and reddish copper elytra; pronotal rugae smooth and shiny; prosternal lobe truncate to weakly emarginate: 4.7-8.5mm; hosts *Acer* and *Salix* spp.; widespread ..... *politus* (Say), (willow gall limb borer)

Black to dark bronze, pronotum sometimes paler bronze; pronotal rugae with microsculpture and therefore duller; prosternal lobe always emarginate; 4.5-5.8mm; host *Cornus florida*; species of eastern North America to MI and TX. Not native to western US: Report! ..... *cephalicus* LeConte



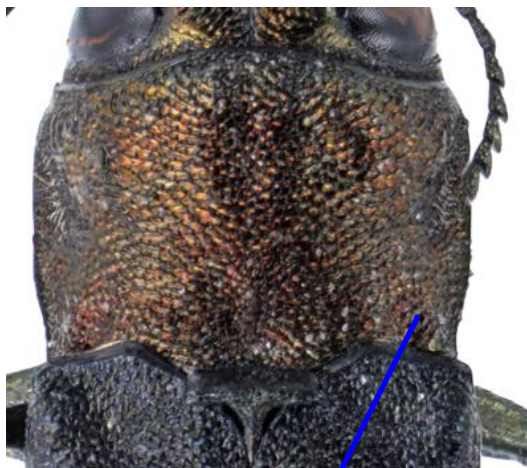


Prehumeral carina absent; bicolored with elytra black (sometimes with blue sheen) and pronotum coppery to green-coppery; 5.75 to 8.75mm; *Quercus utahensis*; AZ, CO, NM, UT..... *quercicola* Fisher

Prehumeral carina distinct; not bicolored, and if it is, elytra with reddish copper color..... 52



*A quercicola*




Prehumeral carina absent

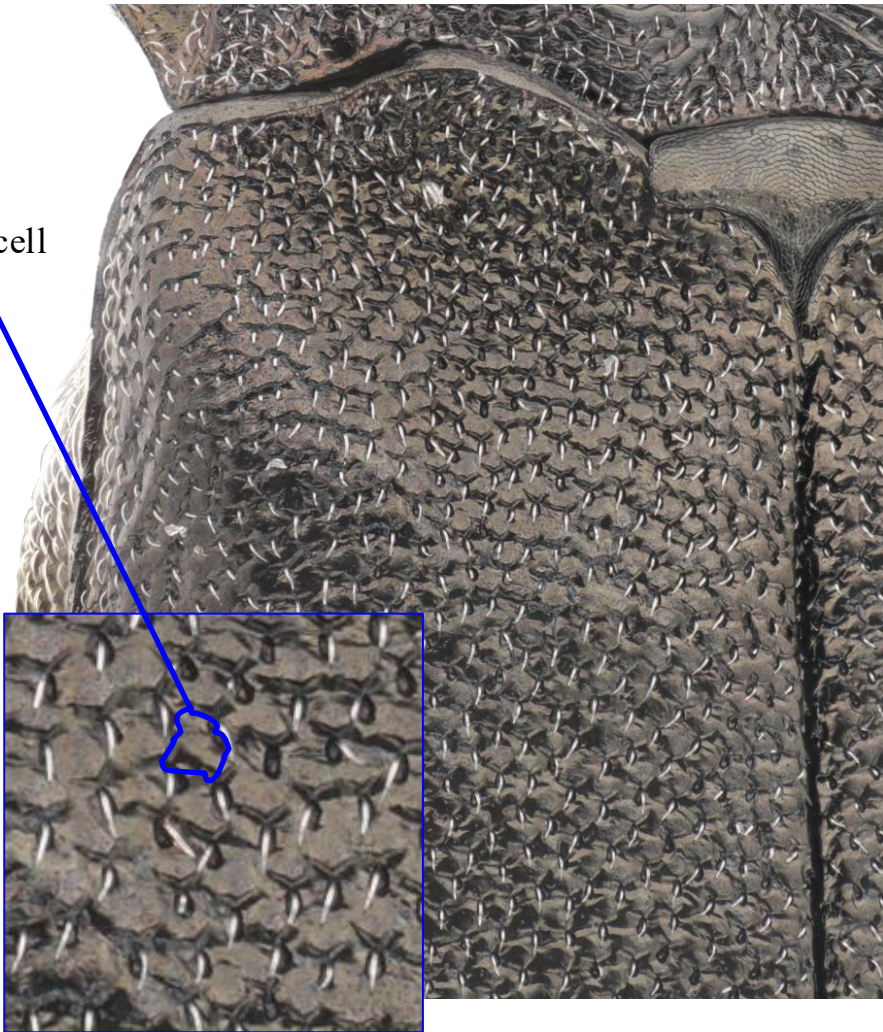
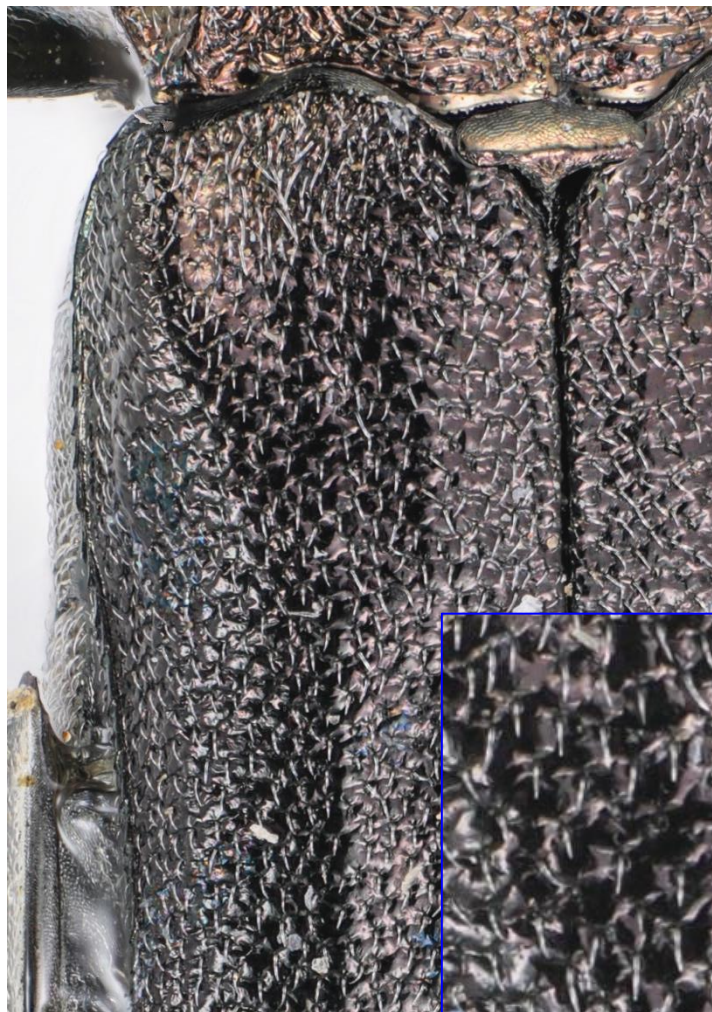


*A anxius*

# 52 (51)

52. Elytral pubescence on basal half longer, about as long as sculpticells and separated by less than their own length ..... 53

Elytral pubescence on basal half short, about half as long as sculpticells and separated by their own length ..... 85 



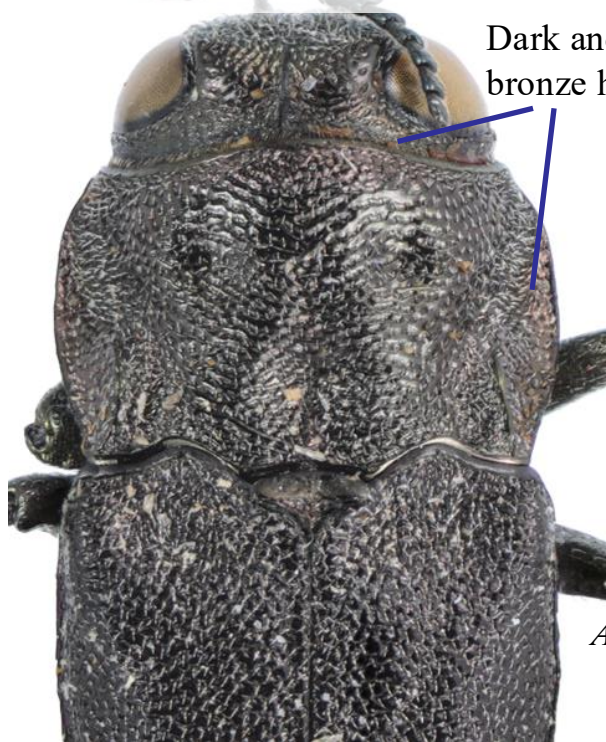
Sculpticell

# 53 (52) part 1 of 2

53. With evident brassy coloration on head and pronotum giving a weak bicolored appearance. *Pronotum and vertex in the male or entire head in the female with coppery or brassy reflections, these sometimes lost in museum specimens; lateral lobes of aedeagus less narrowed apically and more bluntly pointed ventrally, inner margin of each lobe much wider; 5.5-13mm; on birch; originally eastern US and BC but has spread to most of the US* ..... ***anxius*** Gory (bronze birch borer)

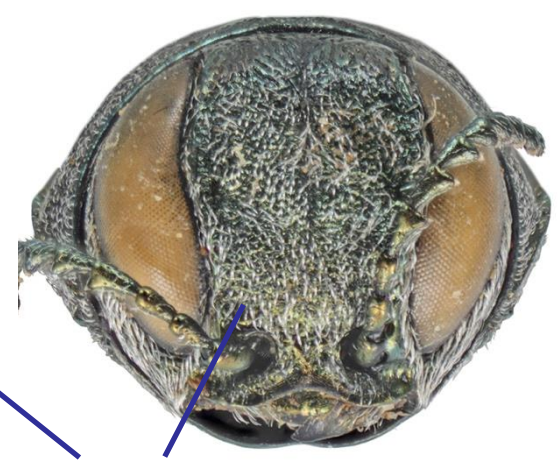
Essentially black on pronotum and head, not subtly bicolored. *Pronotum and head nearly always without coppery reflections, but if with reflections, these never distinct; lateral lobes of aedeagus more strongly narrowed and less bluntly pointed ventrally, inner margin of each lobe narrower; Elytra blackish with indistinct coppery reflection, without spots or with pair of indistinct spots at basal third; 6.8-11.5mm; on poplar; New Brunswick to British Columbia* ..... ***granulatus liragus*** Barter & Brown

Adapted from Bright 1987



Dark and subtle bronze highlights

*A anxius*



Dark bronze absent or greenish-coppery

*A granulatus liragus*



# 53 (52) part 2 of 2



*A anxius*



*A granulatus liragus*



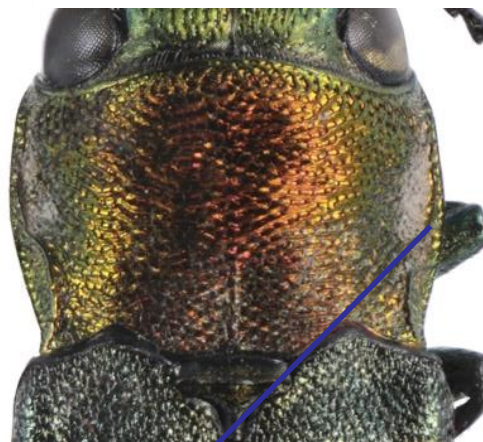


# 54 (37)



Bicolored, with pronotum reddish coppery and elytra green; prehumeral carina long and sinuate, reaching past middle of pronotum and often near apex; 5.7-8.2mm; host tree of heaven; native to Asia but introduced to CT, NJ, NY, PA. Not native to western US: Report! ..... *smaragdifrons* Ganglebauer (tree of heaven borer)

Unicolorous or, if bicolored not as above; when present, prehumeral carina not reaching middle of pronotum .. 55



Prehumeral carina extending past middle of pronotum

*A smaragdifrons*



*A arbuti*



*A parvus*



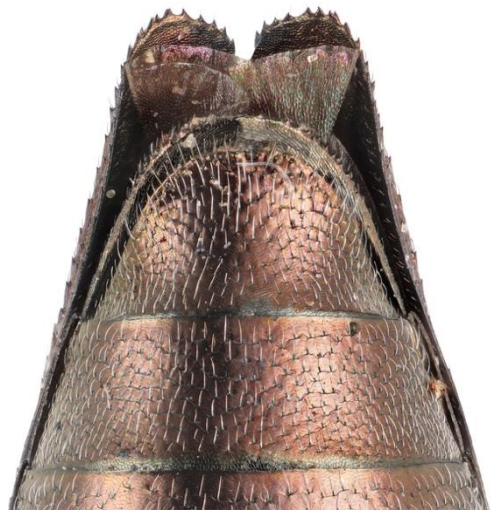
# 55 (54)

Last ventrite not emarginate ..... 56

Last ventrite emarginate ..... 77



*A. abditus*



*A. politus*



Emargination

*A. cyanescens*

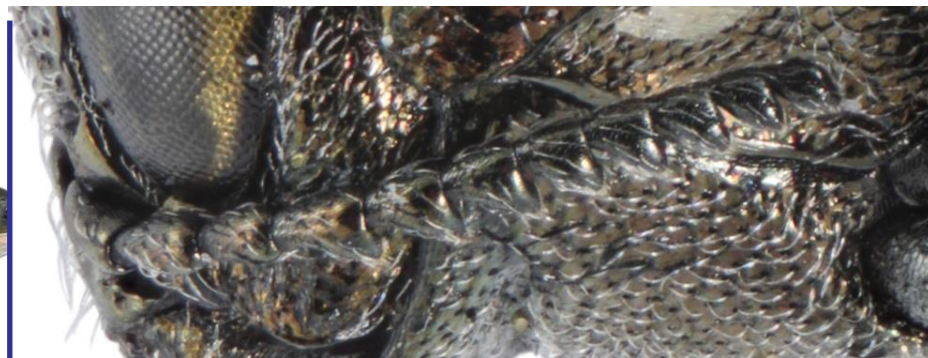
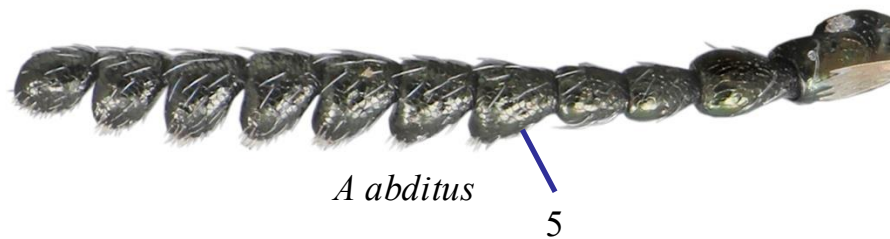


*A. sulcicollis*



56. Antennae serrate from 5 ..... 57

Antennae serrate from 4 ..... 67

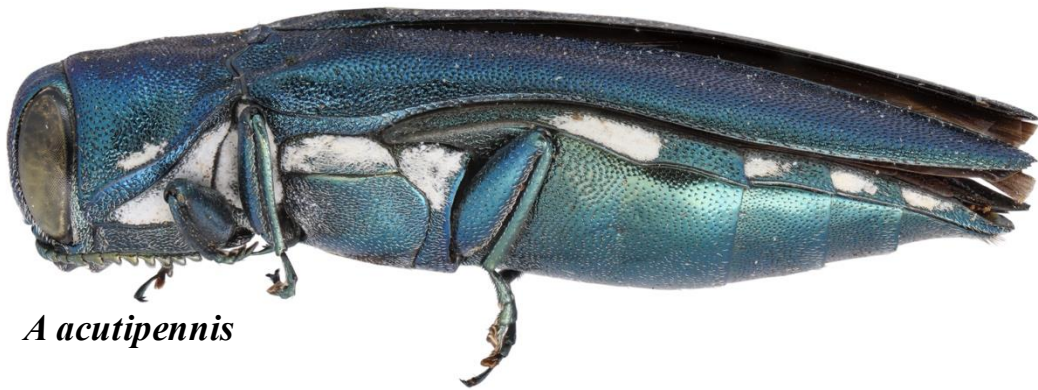




# 57 (56)

57. Blue dorsally; abdomen with spots on lateral sclerites except 2; larger than 7.5mm; 7.5-10mm; host *Quercus* spp.; eastern N. America to MN and TX. Not native to western US: Report! ..... *acutipennis* Mannerheim

Not distinctly blue on pronotum and elytra; if spots present on lateral abdominal sclerites then 2 also with spot; smaller than 7.5mm ..... 58



*A acutipennis*

# 58 (57)

58. Prosternal lobe truncate; pronotal impression usually complete for length of pronotum; 4.5-5mm; *Quercus arizonica*; AZ, NM, and NV. .... *abditus* Horn

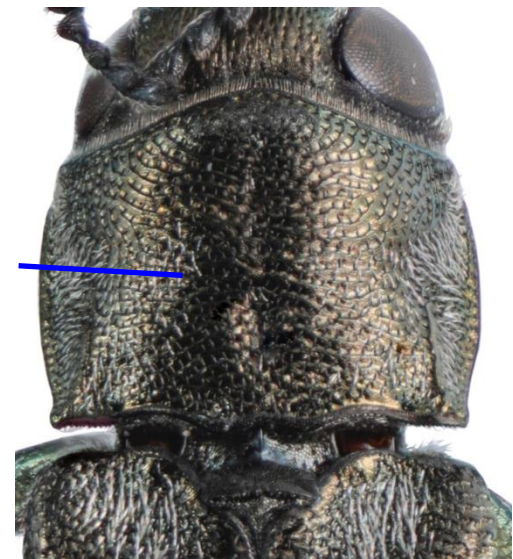
Prosternal lobe emarginate; pronotal impression variable, but when present usually interrupted at middle ..... 59



Median impression present and continuous (may be vague at anterior margin)



Median impression present but interrupted at middle



*A. paracelti*

Prosternum emarginate

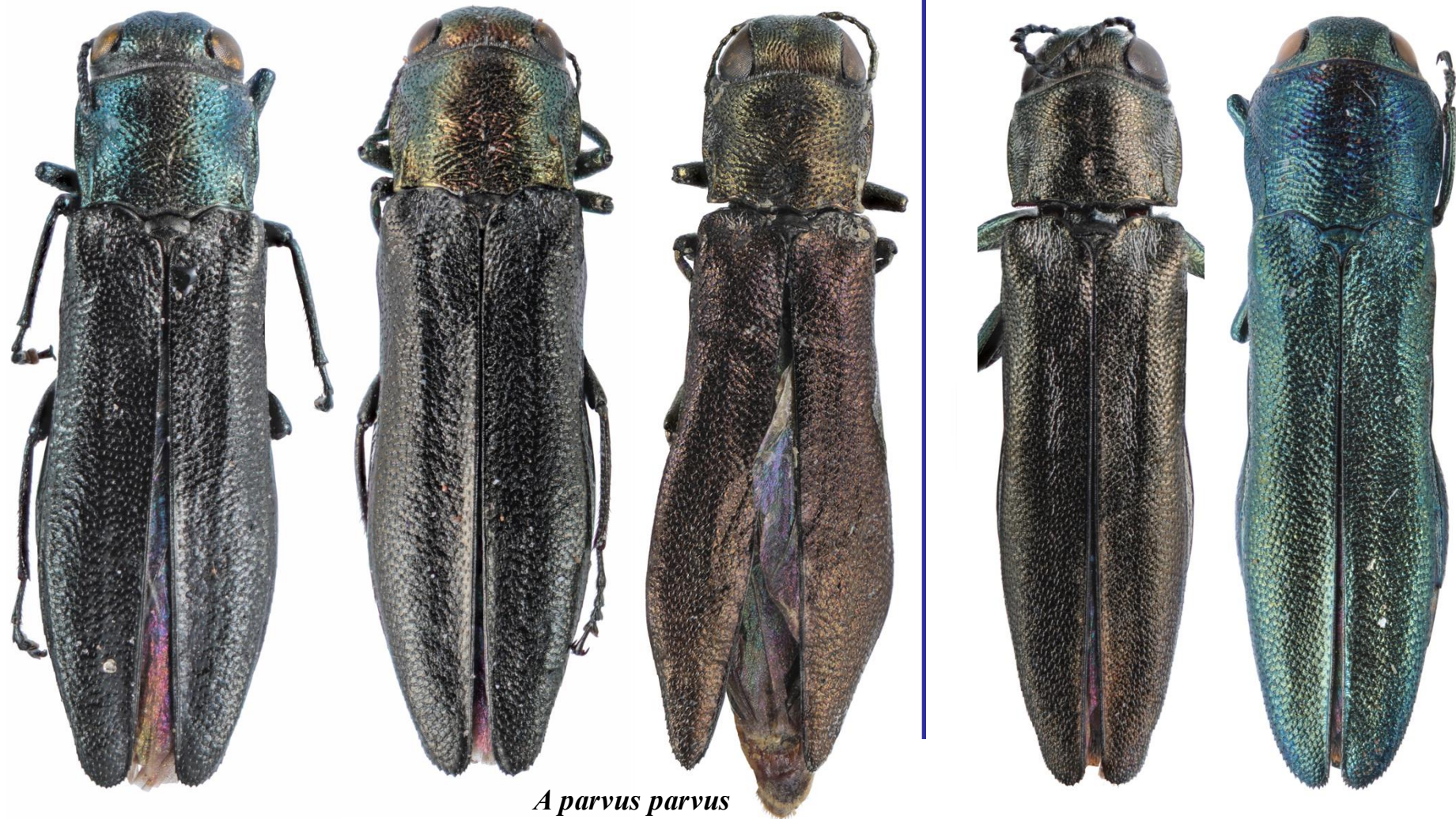


*A. parvus*


# 59 (58)

59. Bicolored, thorax (copper to green copper) paler than elytra (black sometimes with coppery sheen); 3.2-4.8mm; host unknown; east of the Rockies ..... *parvus parvus* Saunders

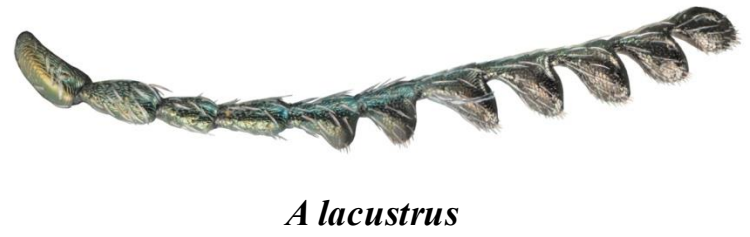
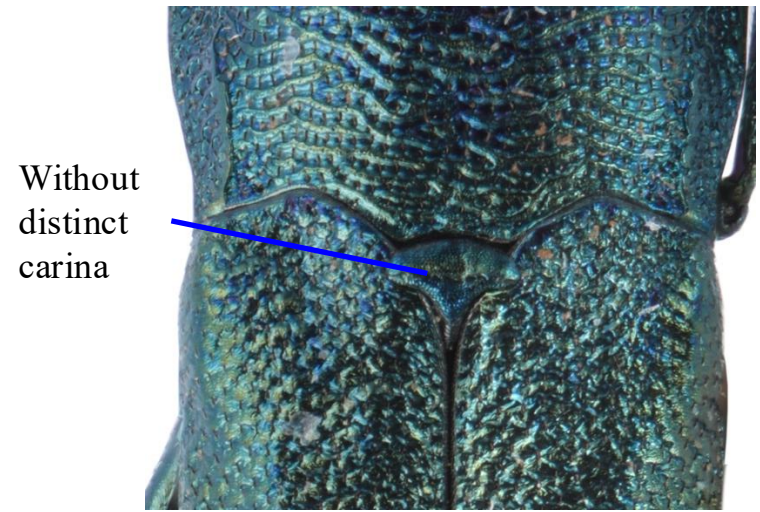
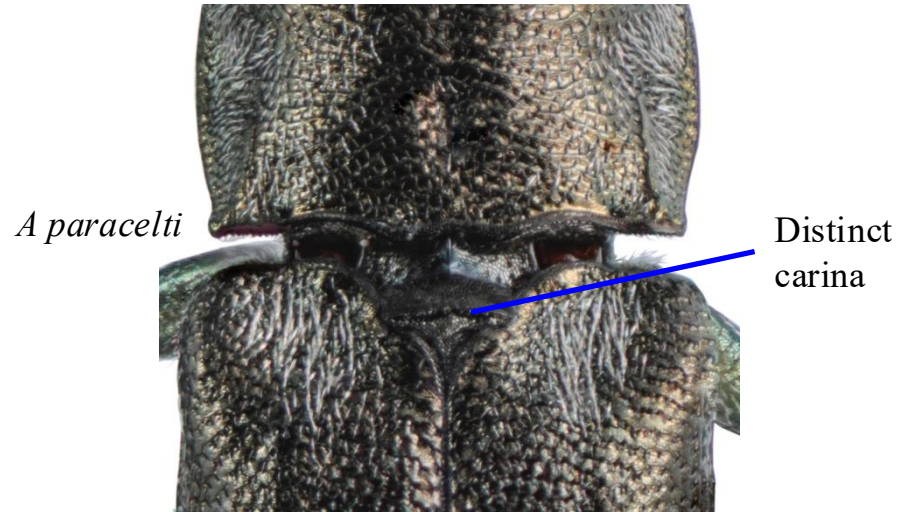
Unicolorous or if bicolored, pronotum darker than elytra; larger ..... 60



# 60 (59) part 1 of 2

60. Scutellum clearly carinate (may have a notch in the middle); outer antennal segments variable; not bicolored, ranges from black to dark coppery. .... 61 (may require male genitalia) 

Scutellum rarely carinate, if carinate often impressed in the middle; outer antennal segments wider than long; usually bicolored, ranges from black to blue to green, if bicolored then thorax blue and elytra green; 4-7.5mm; *Croton* spp.; IL to KS to Ontario and CA ..... *lacustris* LeConte





# 60 (59) part 2 of 2



*A paracelti*



*A lacustris*





61 (60)



Prehumeral carina absent; 2.8-4.5mm; host *Acer grandidentatum*; TX. Not native to the western US: Report! ...  
..... *putillus parputillus* Knull

Prehumeral carina distinct; larger than 3.5mm ..... 62



*A. putillus parputillus*



Prehumeral  
carina absent



*A. egenus*

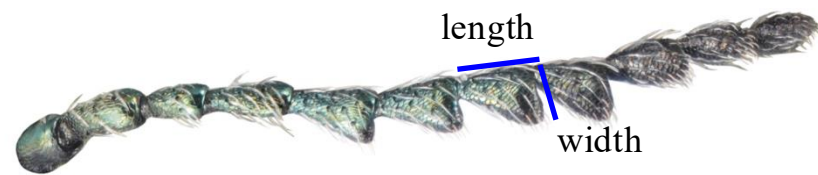
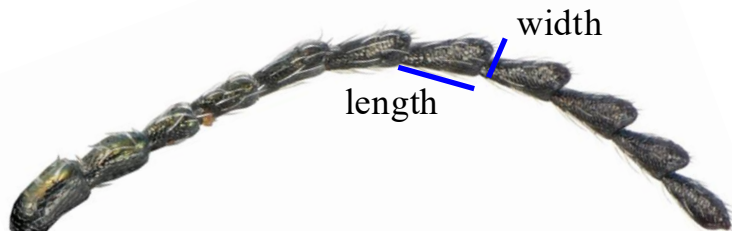


# 62 (61) part 1 of 2



Outer antennal segments distinctly longer than wide ( $>1.5 L \times W$ ); white, fluffy wax secretion usually present with dense setae on ventral thorax; 3.5-5.5mm; *Robinia* spp; eastern North America to NM and SD ... *egenus* Gory  
 \*Rare forms of *egeniformis* may key here, this species typically has distinct elytral spots; 3.75-4.75mm; hosts *Gleditsia triacanthos* and *Sapindus Saponaria*; eastern North America to NM

Outer segments subequal or longer than wide ( $\leq 1.5 L \times W$ ); no white flocculence on ventral thorax, although dense pale setae may be present; 4.5-5.8mm; *Celtis occidentalis*; eastern North America to CO and TX .....  
 ..... *paracelti* Knull



*A. egenus*



*A. paracelti*



Fluffy wax



*A. egenus*



*A. egeniformis*



*A. paracelti*



63 (25)



Prehumeral carina absent, at most an elongate raised area; metallic blue; elytra without distinct costae; 7.5-10mm; host *Quercus* spp.; species of eastern N. America to TX and MN. Not native to western US: Report!  
..... *acutipennis* Mannerheim

Prehumeral carina present and well defined; black to bronze to greenish bronze; elytra with or without costae..... 64



Prehumeral carina absent



*A acutipennis*



*A macer*





Pale band along suture of apical 1/3 of elytra; 6-8.5mm; *Salix* spp.; AZ, CA, NV, and UT

..... *quadriguttatus niveiventris* Horn

Without distinct pale band along suture .....

65



Pale band  
along suture

*A quadriguttatus  
niveiventris*



*A macer*



**Males needed for definitive identification**

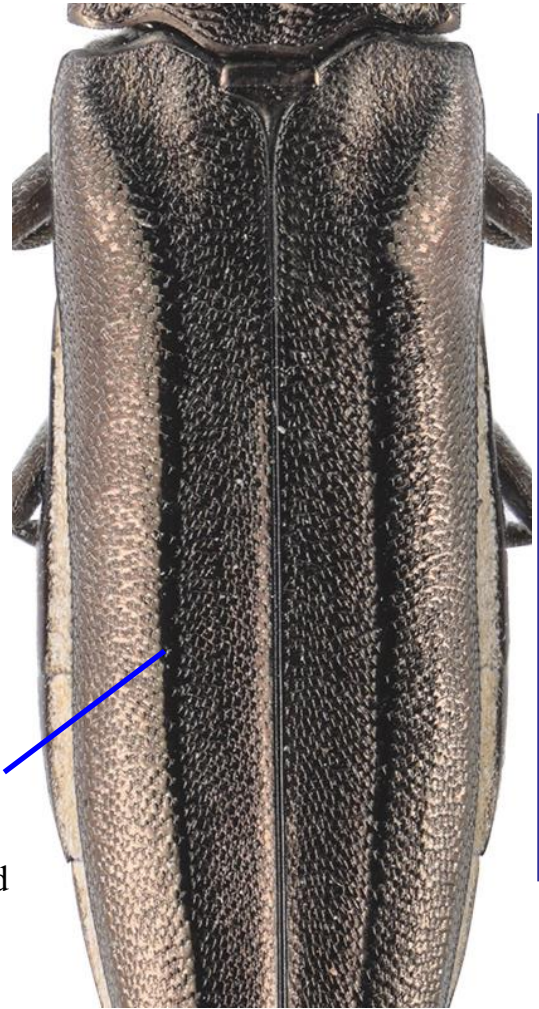
Elytron with strong raised, impunctate costa running down the center; black to greenish bronze; 8.5-14mm; host *Celtis* spp.; FL, LA, and TX. Not native to western US: Report! ..... *macer* LeConte

If costae present, then weaker and not significantly impunctate; larvae in *Betula* and *Populus* spp. .... 66



*A macer*

Costa raised and smooth with reduced punctures



*A granulatus liragus*



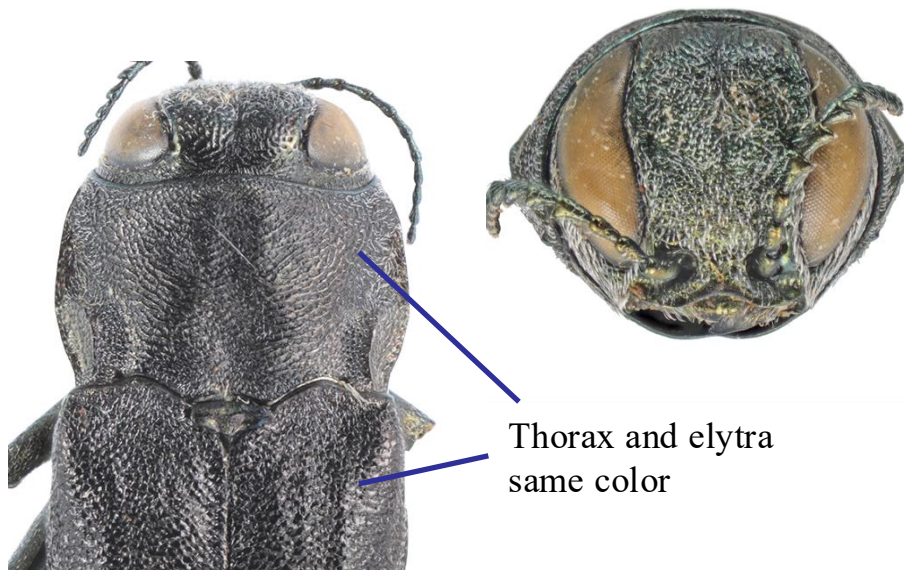
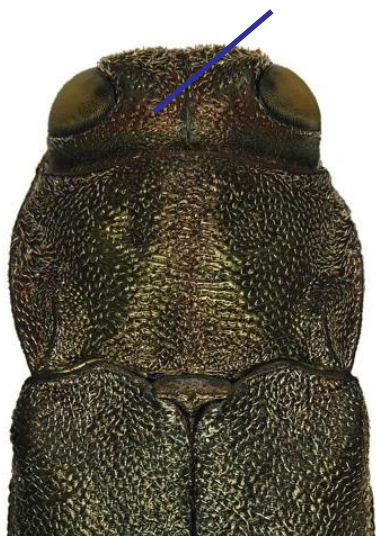
# 66 (65) part 1 of 2

Difficult. May require male genitalia to verify. Modified from Bright:

Evident brassiness on dorsal head and pronotum, therefore pronotum different color from elytra (brassiness dark and best seen under low magnification); pronotum and vertex in the male or entire head in the female with coppery or brassy reflections, these sometimes lost in museum specimens; elytra greenish black; lateral lobes of aedeagus less narrowed apically and more bluntly pointed ventrally, inner margin of each lobe much wider; if costae present, then weak; bronze; 5.5-13mm; host *Betula* spp.; species of North America but introduced west of the Cascade Mountains in Oregon. ....*anxius* Gory, bronze birch borer

Essentially black head and pronotum, pronotum matching elytra; pronotum and head nearly always without coppery reflections, but if with reflections, these never distinct; elytra black. If costae present, then usually two; lateral lobes of aedeagus more strongly narrowed and less bluntly pointed ventrally, inner margin of each lobe narrower; 6.8-11.5mm; poplar; New Brunswick to British Columbia to OR.....  
..... *granulatus liragus* Barter & Brown

Bronze, copper color visible on head and pronotum



*A granulatus liragus*

# 66 (65) part 2 of 2



*A anxius*



*A granulatus liragus*



# 67 (56)



67. Inner surface of anterior claws parallel or turned medially ..... 68

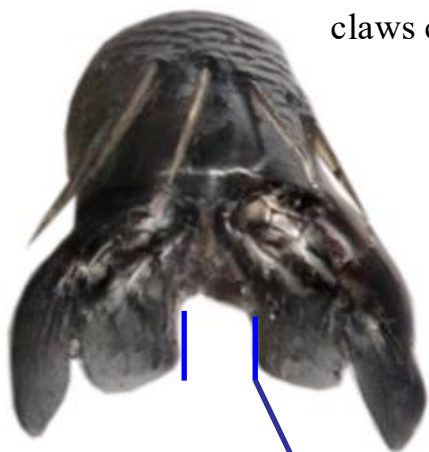
Inner surface of anterior claw turned outward ..... 71



*A angelicus*



Inner surface of claws converging



*A crataegi*

Inner surface of claws parallel or slightly diverging



*A politus*

Inner surface of claws diverging

68. Anterior claws touching (at least almost touching!); with a thick beard; 4.0-6.5mm; hosts *Acer* and *Aesculus* spp.; eastern N. America to TX and MN ..... *masculus* Horn

Anterior claws not touching; species rarely with beards ..... 69



Touching or nearly touching



"Beard"



*A masculus*



Clearly not touching

*A angelicus*



No beard



69 (68)



Serrate from 4

Not bicolored or, if bicolored, pronotum black; 4.8-8mm; host *Amelanchier alnifolia* and *Crataegus* spp.; eastern North America. Not native to western US: Report! ..... *crataegi* Frost

Bicolored..... 70



*A crataegi*



*A amelanchieri*



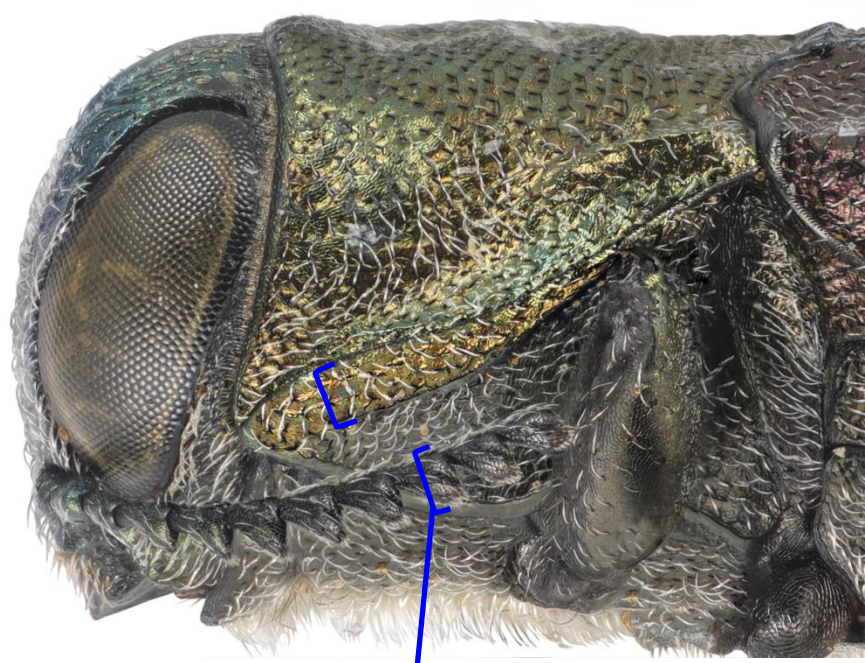
*A angelicus*



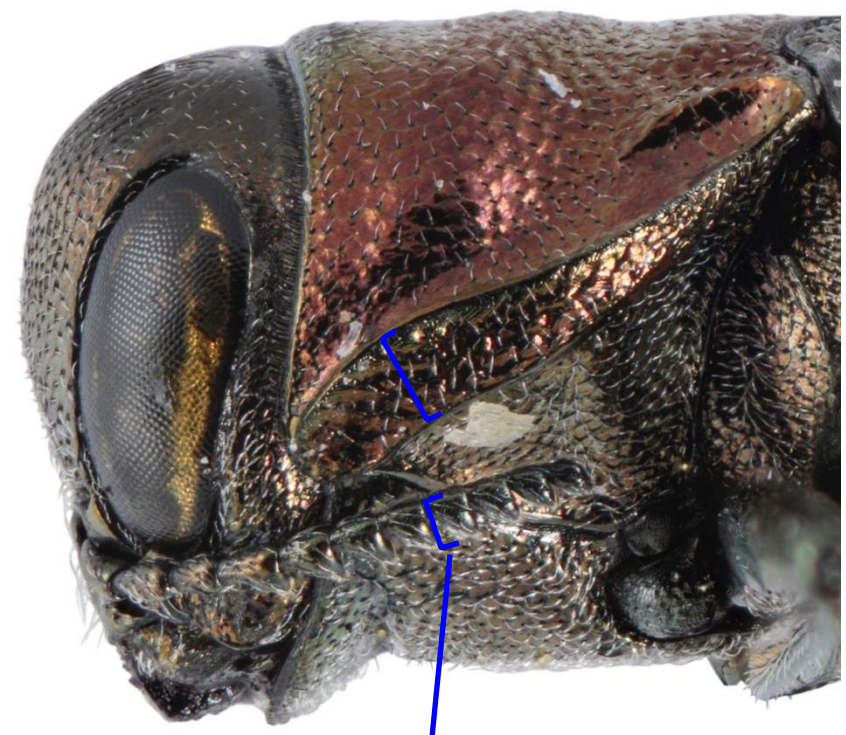
# 70 (69) part 1 of 3

Space between lateral pronotal carinae subequal to antennal width; margin of labrum emargination obtuse angle; elytra black with a reddish lustre and pronotum brassy; 5.0-6.0mm; host *Amelanchier* spp.; CA, CO, MI, ND, NV, OR, PA, and UT ..... *amelanchieri* Knull

Distance between lateral pronotal carinae distinctly wider than antennae in anterior half; margin of labrum emargination evenly rounded; two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and OR ..... *angelicus* Horn



Antenna about as wide as space between lateral carinae



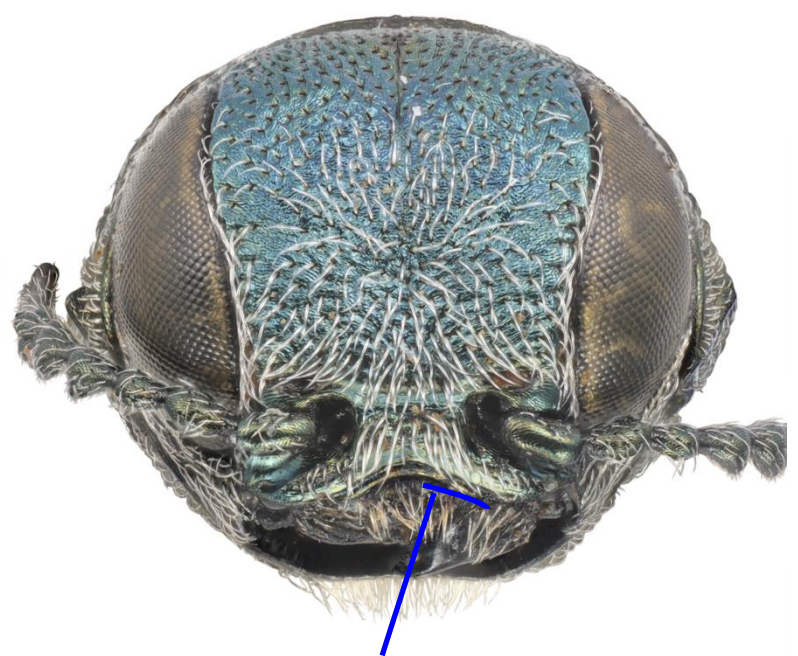
Antenna narrower than space between lateral carinae



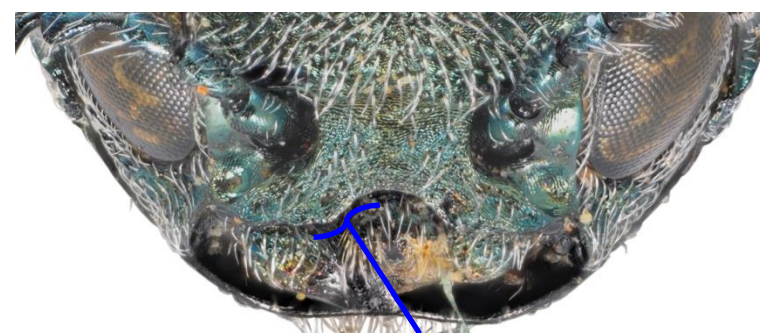
# 70 (69) part 2 of 3

Space between lateral pronotal carinae subequal to antennal width; margin of labrum emargination obtuse angle; elytra black with a reddish lustre and pronotum brassy; 5.0-6.0mm; host *Amelanchier* spp.; CA, CO, MI, ND, NV, OR, PA, and UT ..... *amelanchieri* Knull

Distance between lateral pronotal carinae distinctly wider than antennae in anterior half; margin of labrum emargination evenly rounded; two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and OR ..... *angelicus* Horn



Sides of labral emargination nearly straight



Sides of labral emargination sinuate



*A angelicus*



# 70 (69) part 3 of 3

Space between lateral pronotal carinae subequal to antennal width; margin of labrum emargination obtuse angle; elytra black with a reddish lustre and pronotum brassy; 5.0-6.0mm; host *Amelanchier* spp.; CA, CO, MI, ND, NV, OR, PA, UT ..... *amelanchieri* Knull

Distance between lateral pronotal carinae distinctly wider than antennae in anterior half; margin of labrum emargination evenly rounded; two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and OR ..... *angelicus* Horn



*A amelanchieri*



*A angelicus*





Beginning

# 71 (67) part 1 of 2

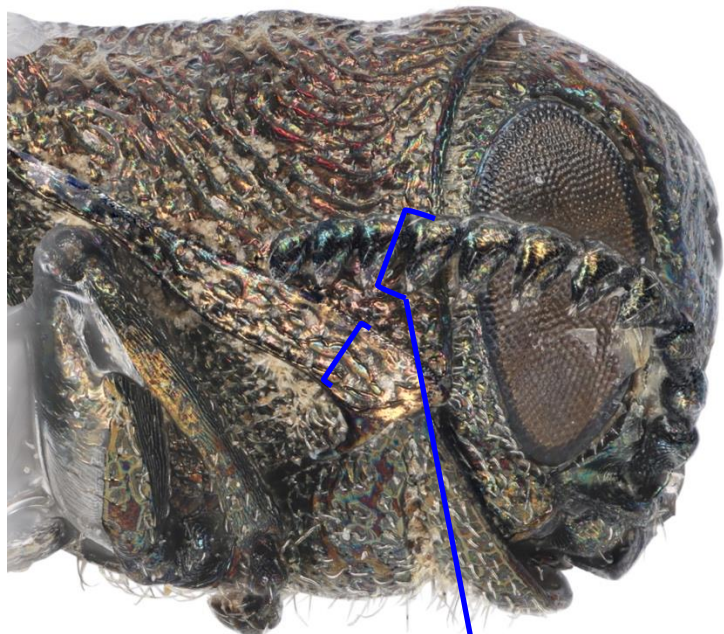


Serrate from 4

Space between lateral pronotal carinae narrower than widest segments of antennae, with coarse sculpture running approximately parallel to carinae; antennal segments distinctly wider than long; usually reddish coppery; 3.5-6mm; host *Hypericum perforatum* (introduced biocontrol agent); ID, OR and WA ..... *hyperici* (Creutzer) (St. John's wort beetle)

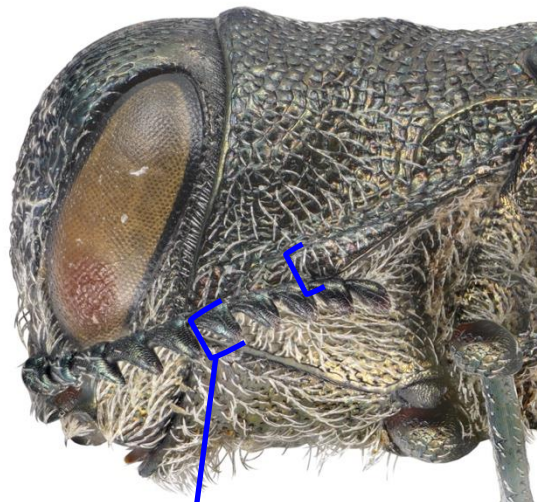
Space between lateral pronotal carinae subequal or larger than antennal width, antennal segment ratio variable

..... 72



*A hyperici*

Widest segment wider than space between lateral carina



*A politus*

Antenna equal to or narrower than space between lateral carinae





# 71 (67) part 2 of 2 ■

Space between lateral pronotal carinae narrower than widest segments of antennae, with coarse sculpture running approximately parallel to carinae; antennal segments distinctly wider than long; usually reddish coppery; 3.5-6mm; host *Hypericum perforatum* (introduced biocontrol agent); ID, OR and WA ..... *hyperici* (Creutzer) (St. John's wort beetle)

Space between lateral pronotal carinae subequal or larger than antennal width, antennal segment ratio variable ..... 72



*A hyperici*





Beginning

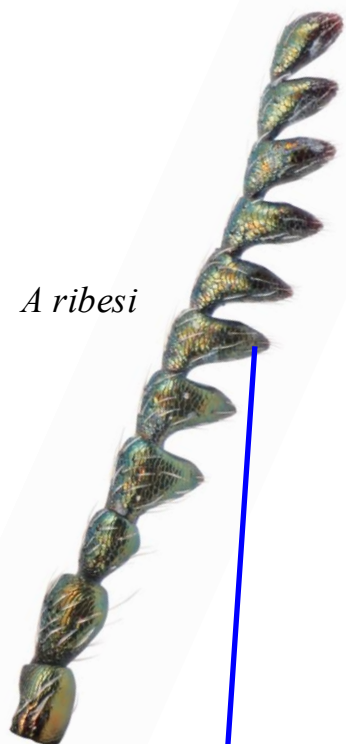
72 (71)

Serrate from 4

Antennal segments 7-11 distinctly wider than long..... 73

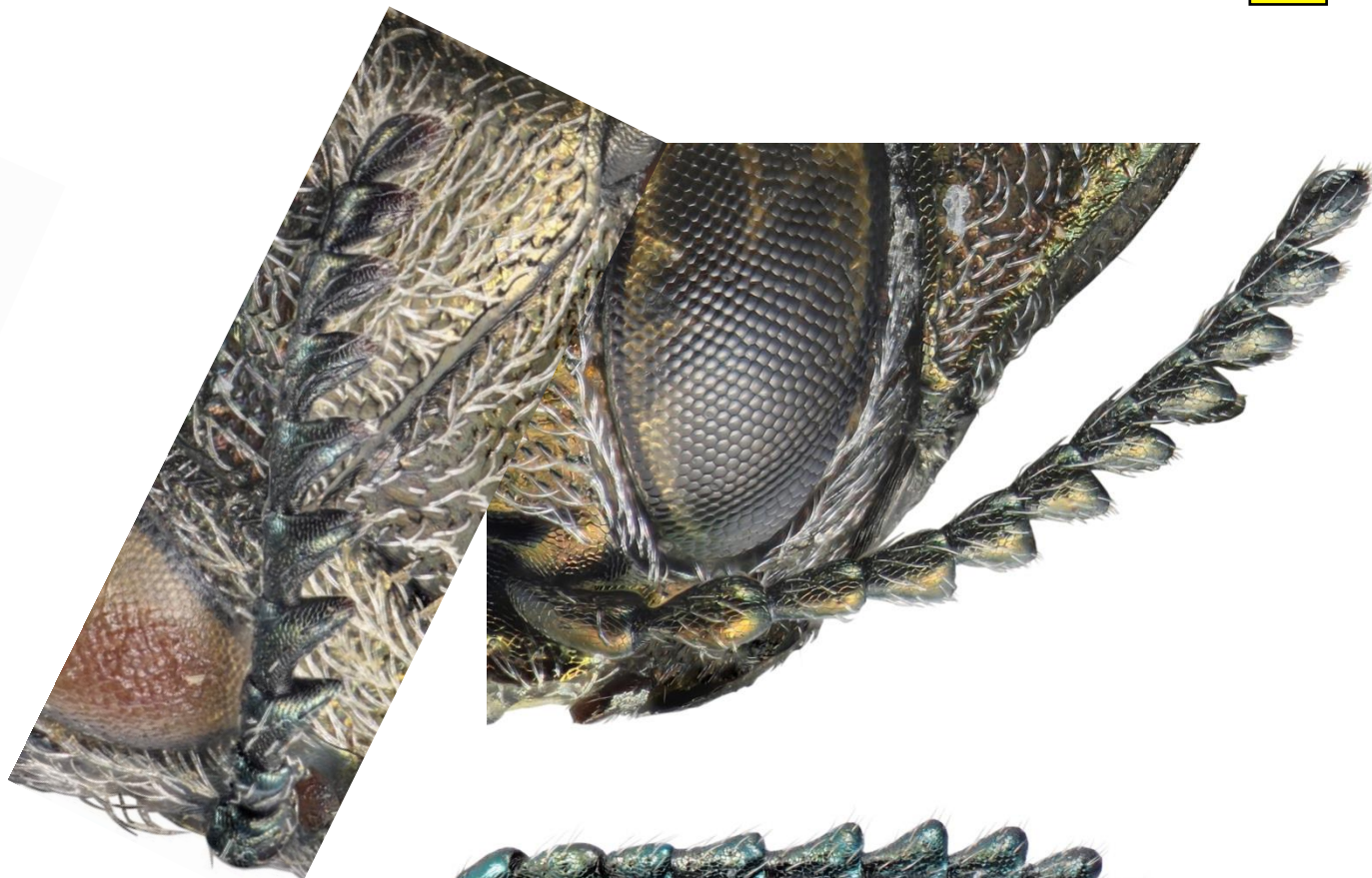
Antennal segments 7-11 not distinctly wider than long. .... 75

*A ribesi*



Segments clearly wider than long

*A politus*



*A cephalicus*



Elytra with setae very small, thin and difficult to see; copper to reddish copper (other colors rare) ..... 74

Elytra usually with easily visible pale setae on some part; color highly variable: black, to blue, green, red copper, or gold, some forms bicolored usually with a bronze pronotum and reddish copper elytra; 4.7-8.5mm; hosts *Acer* and *Salix* spp.; widespread ..... *politus* (Say), (willow gall limb borer)



*A. cuprescens*



*A. ribesi*



*A politus*



# 74 (73) part 1 of 3

Basal 1/3 sides of pronotum (viewed dorsally) straight, rarely sinuate, pronotum widest at middle (rarely in anterior half); typically olive green metallic; rugae on head straight; 4.8-7.2mm; hosts *Rosa* spp. and *Rubus* spp.; Europe and north Asia introduced to much of N. America including OR and WA, but not BC or CA

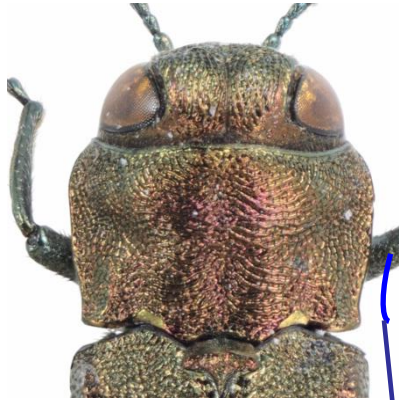
..... *cuprescens* (Menetries), (rose stem girdler)

Basal 1/3 sides of pronotum sinuate, pronotum widest in anterior half (rarely at middle); typically bronzy black; rugae on top of head curving laterally; 4.9-7.5mm; *Ribes* spp.; Europe and Asia introduced to MN and Canada (New Brunswick, Ontario, and Quebec). Not native to western US: Report! ..... *ribesi* Schaeffer



Straight

*A. cuprescens*



Curved toward base

*A. ribesi*





# 74 (73) part 2 of 3

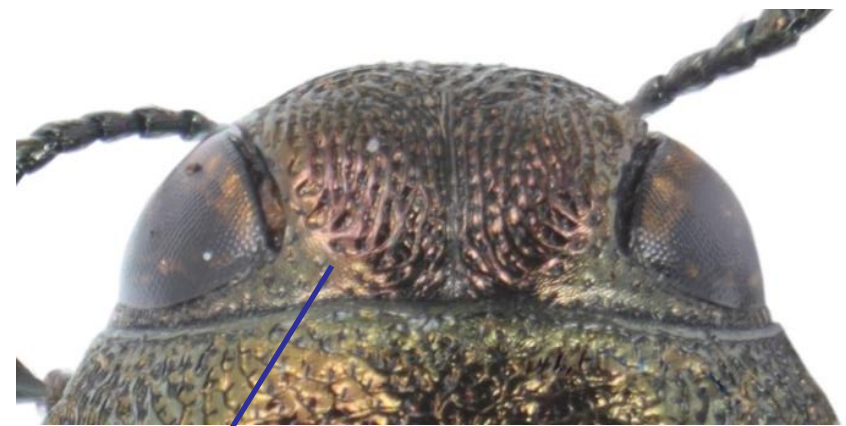
Basal 1/3 sides of pronotum (viewed dorsally) straight, rarely sinuate, pronotum widest at middle (rarely in anterior half); typically olive green metallic; rugae on head straight; 4.8-7.2mm; hosts *Rosa* spp. and *Rubus* spp.; Europe and north Asia introduced to much of N. America including OR and WA, but not BC or CA

..... *cuprescens* (Menetries), (rose stem girdler)

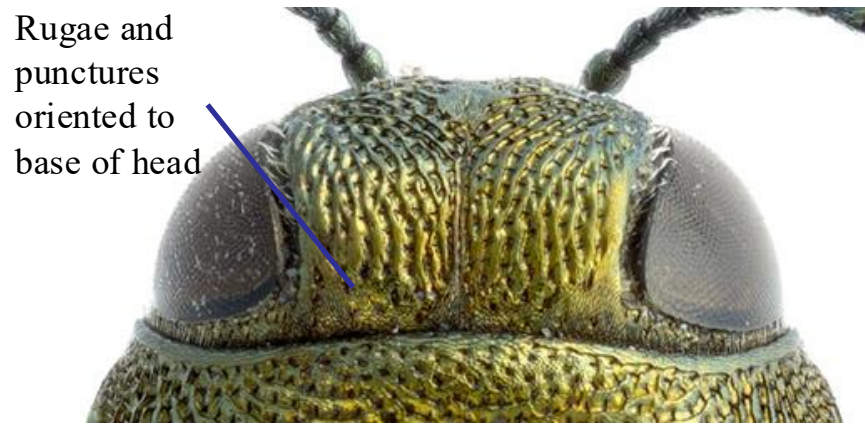
Basal 1/3 sides of pronotum sinuate, pronotum widest in anterior half (rarely at middle); typically bronzy black; rugae on top of head curving laterally; 4.9-7.5mm; *Ribes* spp.; Europe and Asia introduced to MN and Canada (New Brunswick, Ontario, and Quebec). Not native to western US: Report! ..... *ribesi* Schaeffer



*A. cuprescens*



*A. ribesi*



Rugae and punctures oriented to base of head

Rugae and punctures oriented laterally near base





*A. cuprescens*



Typical form



*A. ribesi*



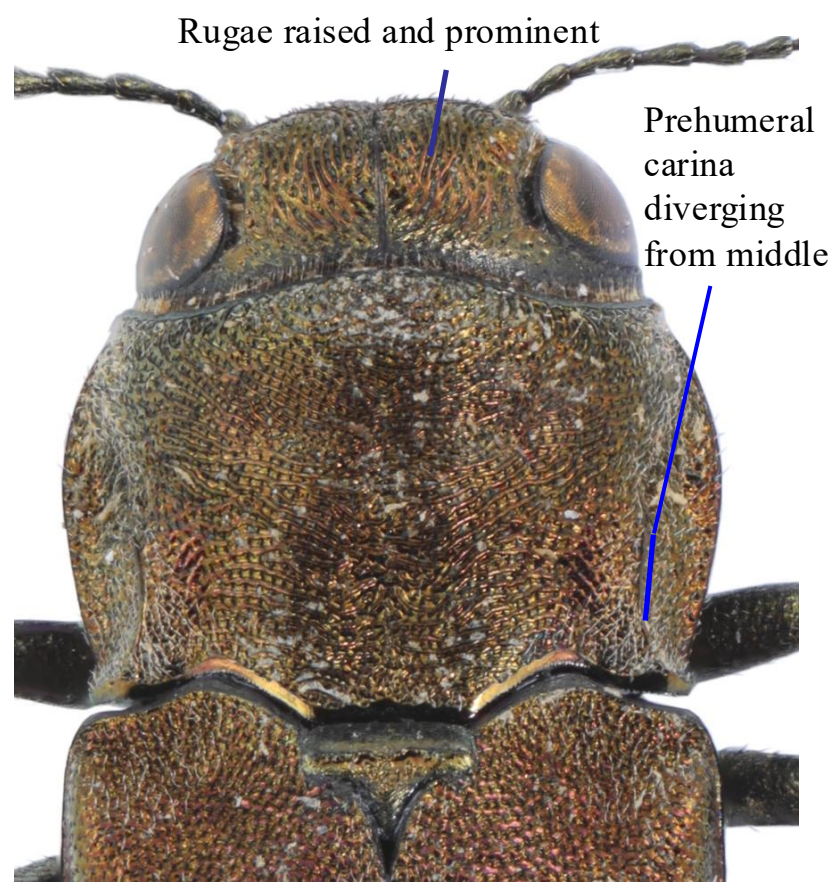


# 75 (72) part 1 of 2

Serrate from 4

Vertex coarsely sculpted with dense rugae converging dorsally with minimal microsculpture; Larger: 6.1-8.7mm. Prehumeral carinae divergent, viewed dorsally; hosts *Cydonia oblongata*, *Emmenopterys henryi*, *Malus* spp., *Prunus* spp., and *Sorbus* spp. East Asia to Russia. Not native to North America. Report! ..... *mali* Matsumura

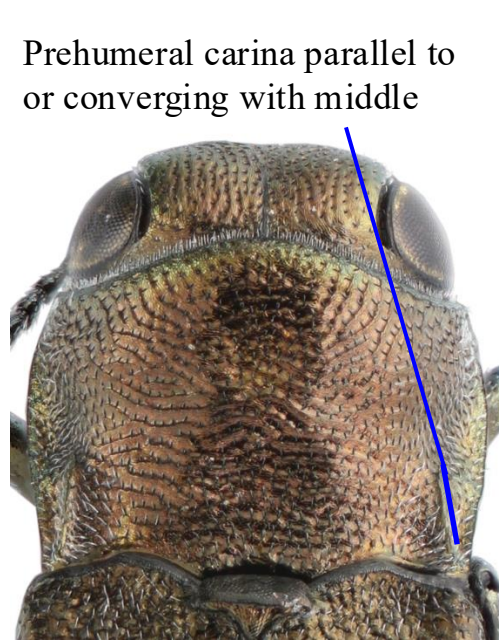
Vertex less coarse, parallel microsculpture variable; Smaller: 4.5-8.5mm; prehumeral carinae variable.... 76



Rugae raised and prominent

Prehumeral carina diverging from middle

*A mali*



Prehumeral carina parallel to or converging with middle

*A cephalicus*



Rugae flattened

*A politus*



# 75 (72) part 2 of 2



*A. mali* female



*A mali* male

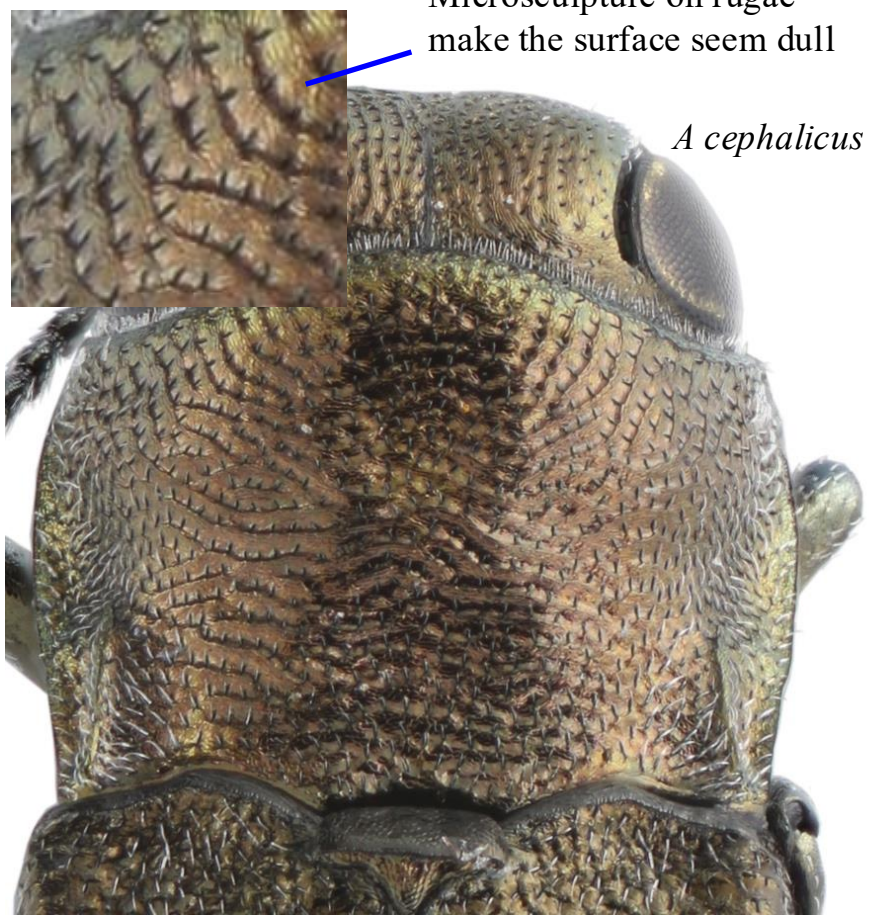


# 76 (75) part 1 of 2

Microsculpture making pronotum and vertex appear less shiny; smaller species (less than 6mm); dorsally dark brown to black sometimes with bronzy pronotum; 4.5-5.8mm; *Cornus florida*; eastern N. America. Not native to western US: Report! ..... *A. cephalicus* LeConte

Microsculpture less dense, causing the surface to seem shinier on pronotum and vertex; color highly variable, black, copper gold, reddish, blue and green; 4.7-8.5mm; hosts *Acer* and *Salix* spp.; North America ... *politus* (Say) includes *A. burkei* (personal communication Richard Westcott October 31, 2021) as DNA data shows them to be one species.

Microsculpture on rugae make the surface seem dull



*A cephalicus*



*A politus*



# 76 (75) part 2 of 2



Serrate from 4



*A cephalicus*



*A politus*



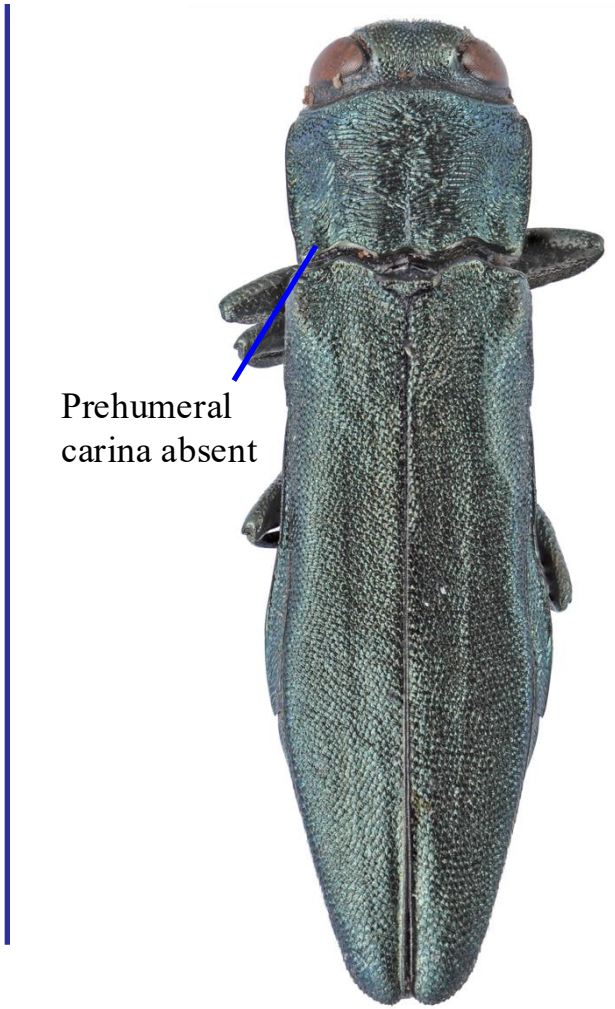
77 (55)



Antennae serrate from 4; prehumeral carina variable ..... 78



Antennae serrate from 5; prehumeral carina absent; 5-9mm; *Quercus rubra* and *Fagus sylvatica*; northeast North America. Not native to the western US: Report! ..... *sulcicollis* LaCordaire



Prehumeral carina absent





78 (77)



Serrate from 4

Front of head with at most a narrow line impressed; prehumeral carina distinct; bronze or bicolored with blue elytra and green-blue pronotum ..... 79

Front of head deeply impressed; prehumeral carina weak to absent; green to blue; 5.2-7.8mm; *Lonicera* spp.; eastern US and introduced to CO, OR, and UT ..... *cyanescens* (Ratzeburg)



Head deeply impressed



*A cyanescens*

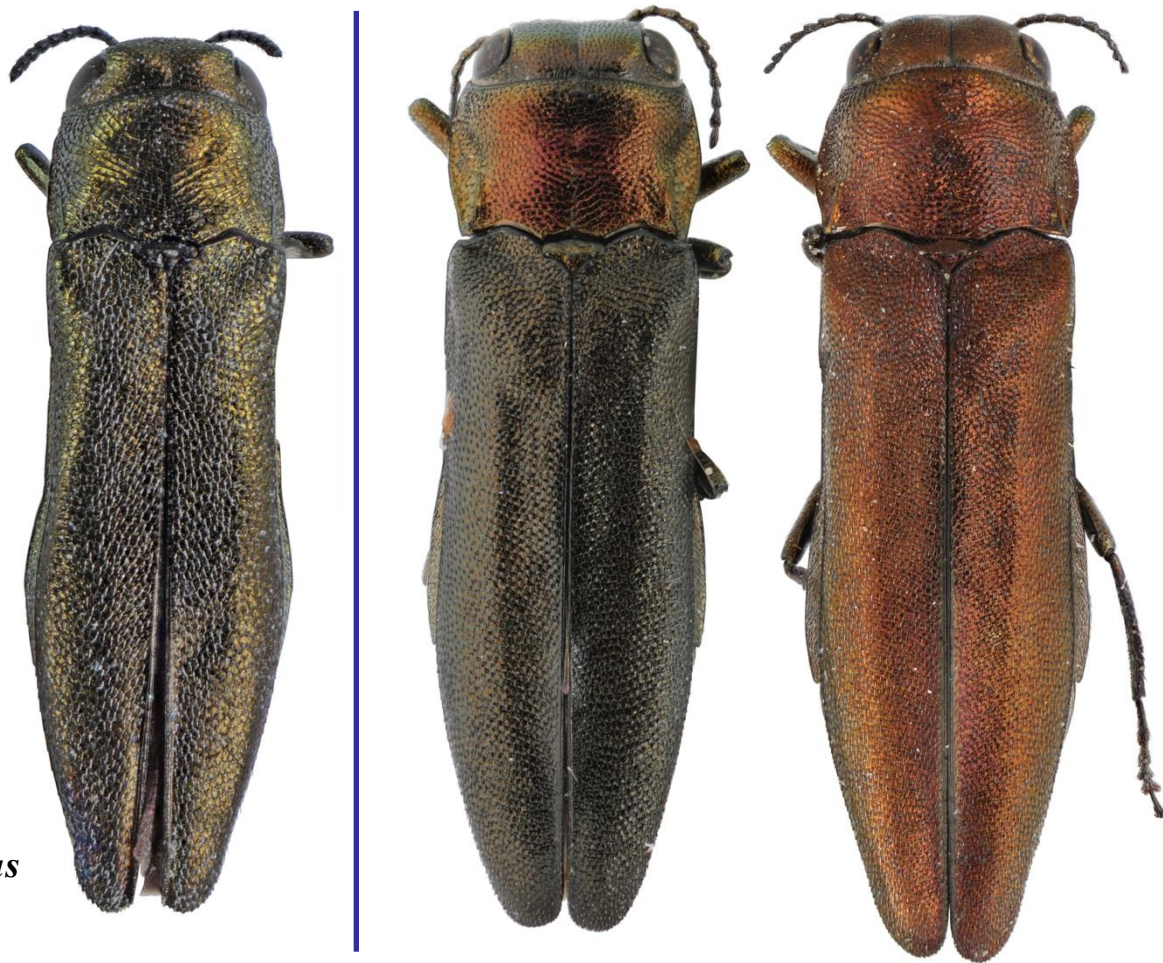


# 79 (78)



Smaller; bronze; protarsal claws parallel to diverging; 3.7-5.8mm; host *Albizia julibrissin*; east Asia introduced to AL, GA, NC, SC and TN. .... *subrobustus* Saunders

Larger; pronotum red coppery or green, with elytra reddish to black, red coppery, or blue; protarsal claws converging; 4.6-7.5mm..... 80

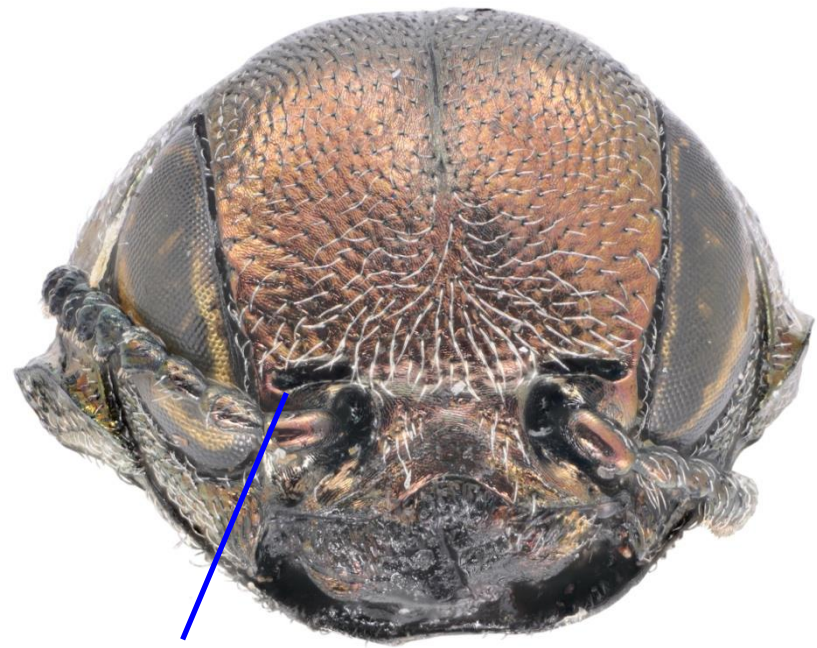


*A subrobustus*

# 80 (79) part 1 of 2

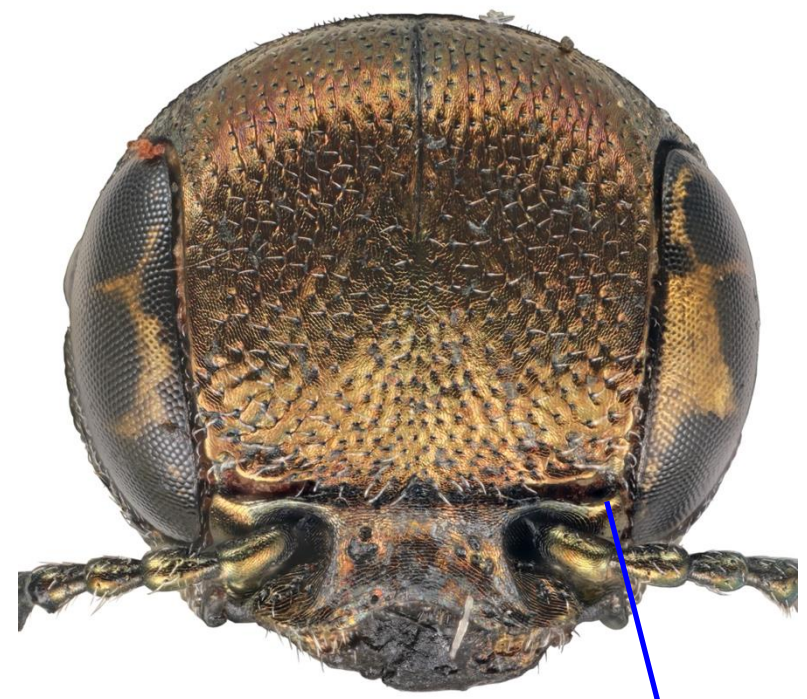
Two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; character to use with caution: pits above antennal bases tend to be similar at both ends, lateral horns of clypeus with upper portion narrower than base or obscure; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and OR ..... *angelicus* Horn

Larger; pronotum red coppery, with elytra reddish to black; character to use with caution: pits above antennal bases tend to be wider laterally, upper portion of lateral horn of clypeus tends to be wider, at least apically; 5.5-7.5mm; host *Arbutus menziesii* and *Arctostaphylos* spp.; CA, OR, and BC ..... *arbuti* Fisher



Pit similar laterally and medially

*A angelicus*



Pit wider with a more developed lip laterally

*A arbuti*

# 80 (79) part 2 of 2

Two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; character to use with caution: pits above antennal bases tend to be similar at both ends, lateral horns of clypeus with upper portion narrower than base or obscure; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and OR ..... *angelicus* Horn

Larger; pronotum red coppery, with elytra reddish to black; character to use with caution: pits above antennal bases tend to be wider laterally, upper portion of lateral horn of clypeus tends to be wider, at least apically; 5.5-7.5mm; host *Arbutus menziesii* and *Arctostaphylos* spp.; CA, OR, and BC ..... *arbuti* Fisher



*A angelicus*



*A arbuti*





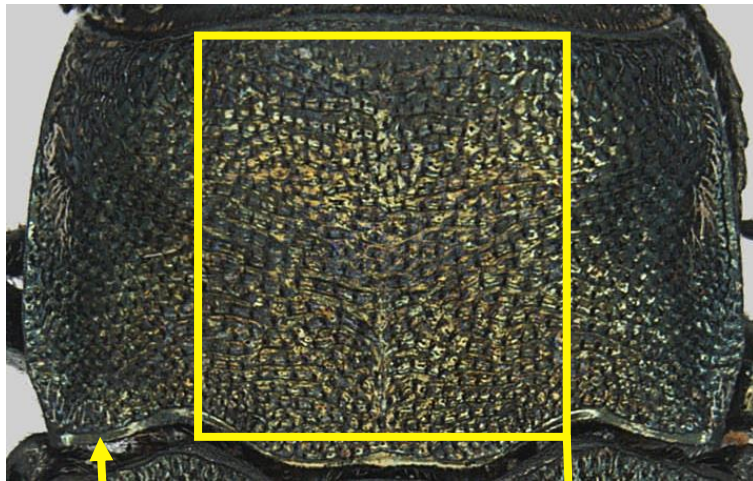
# 81 (22) part 1 of 2

No prehumeral carina; distinct (though often coalescent) punctures on median portion of pronotum; 8.5-13mm; *Castanea sativa*, *Fagus sativa*, and *Quercus* spp.; Europe and Africa. Not native to North America: Report!

..... *biguttatus* Fabricius (oak splendor beetle)

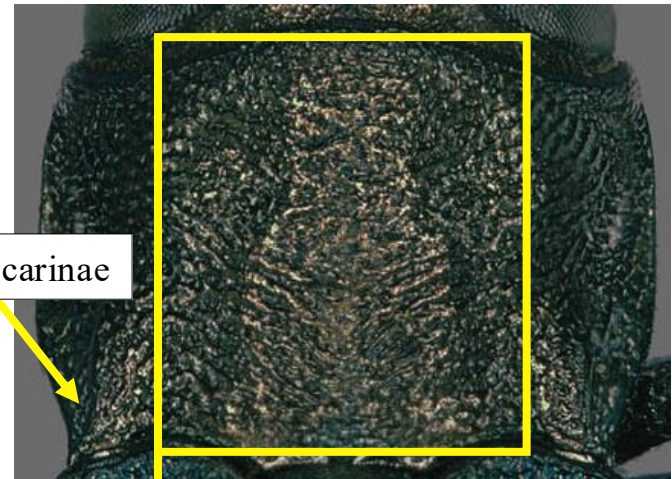
\*Varies in dorsal coloration from dull to bright bronzy green.

Prehumeral carina present; no (or indistinct) punctures on median portion of pronotum ..... 82



no carina

distinct punctures



sharp carinae

no or indistinct punctures



Close-up of posterior angle of pronotum showing carina.



81 (22): part 2 of 2



“Dull”  
form.



“Bright”  
form.

*Agrilus*  
*biguttatus*  
Fabricius



# 82 (81)



Spine projecting beyond margin of pygidium; antennae serrate from 4 ... *quadriguttatus* group

..... 83



No spine on pygidium; antennae variable ..... 84



*A quadriguttatus fulminans*

Pygidial spine



*A crataegi*

No pygidial spine

- Larger, 7-11mm; black; without distinct costae; host *Alnus* and *Salix* spp.; continental US ..... *quadriguttatus quadriguttatus* Gory
- ..... Smaller, 6-8.5mm; typically reddish coppery; costae on the weak side; *Salix* spp.; AZ, CA, NV, and UT
- ..... *quadriguttatus niveiventris* Horn
- ..... Smaller, 5.5-7mm; typically blue; often with costae present; host *Salix* spp.; CA ..... *quadriguttatus fulminans* Fisher



*A. q. quadriguttatus*  
female (left) by J. Hansen



*A. q. niveiventris*



*A. q. fulminans*



# 84 (82)



Antennae serrate from 4; 4.8-8mm. Host: *Amelanchier alnifolia* and *Crataegus* spp. Species of eastern North America. Not native to western US: Report! ..... *crataegi* Frost

Antennae serrate from 5; 4.5-5mm; host *Quercus arizonicus*; AZ, NM, NV ..... *abditus* Horn



*A crataegi*



*A abditus*



# 85 (52)



Elytra black; broader with gradually tapering elytral apices; 5.5-13mm; poplar and aspen; eastern species southwest to AZ ..... *horni* Kerremans (aspen root girdler)

Elytra reddish coppery (often pronotum, too); slender with narrow elytral apices; 6-8.5mm; *Salix* spp.; AZ, CA, NV, and UT ..... *quadriguttatus niveiventris* Horn



*A horni*



*A quadriguttatus niveiventris*

# References

- Barr, W.F. 1971. Family Buprestidae (in Hatch). The Beetles of the Pacific Northwest, Part 5. 55-90
- Bright, D.E. 1987. The Metallic Wood-boring Beetles of Canada and Alaska Coleoptera: Buprestidae. The Insects and Arachnids of Canada, Part 15. 335pp.
- Chamorro, M.L., E. Jendek, R. A. Haack, T.R. Petrice, N.E. Woodley, A.S. Konstantinov, M.G. Volkovitch, X. Yang, V.V. Grebennikov, and S.W. Lingafelter. 2015. Illustrated guide to the emerald ash borer *Agrilus planipennis* Fairmaire and related species (Coleoptera, Buprestidae). Pensoft, Sofia-Moscow. 197pp.
- Fisher, W.S. 1928. A revision of the North American species of buprestid beetles belonging to the Genus *Agrilus*. Smithsonian Institution United States National Museum Bulletin 145. 347pp.
- Hansen, J.A. 2010. Identification and phylogenetic characterization of select species of Buprestidae (Coleoptera) and Sesiidae (Lepidoptera) wood boring insect Families occurring across the southeastern United States. PhD dissertation, University of Tennessee. 205pp.
- Hansen, J.A., J.P. Basham, and C.A. Nalepa. 2021. New adult host records for three Buprestidae (Coleoptera) rarely encountered in the United States and significant extension of the known geographic range of *Agrilus pilosicollis* Fisher. *Insecta Mundi*. 0869: 1-6.
- Hespenheide, H.A. 2007. The identity of *Agrilus impexus* Horn, a new species, and taxonomic notes and records for other *Agrilus* Curtis species (Coleoptera: Buprestidae). *Zootaxa*. 1617:57-66.
- Hespenheide, H.A., R.L. Westcott, and C.L. Bellamy. 2011. *Agrilus* Curtis (Coleoptera: Buprestidae) of the Baja California peninsula, Mexico. *Zootaxa*. 2805:36-56.
- Jendek, E. and V. Grebennikov. 2011. *Agrilus* (Coleoptera, Buprestidae) of East Asia. Prague, Jan Farkac. 362pp.
- Jendek, E., V.V. Grebennikov, and L. Bocak. 2015. Undetected for a century: Palaearctic *Agrilus ribesi* Schaefer (Coleoptera: Buprestidae) on currant in North America, with adult morphology, larval biology and DNA barcode. *Zootaxa*. 4034(1):112-126.
- Knull, J.N. 1944. Notes on *Agrilus* with descriptions of two new species. *Annals of the Entomological Society of America*. 37(1):75-83.
- Volkovitsch, M.G., A.V. Kovalev, and M.J. Orlova-Bienkowskaja. 2020. Current Distribution and Diagnostic Features of Two Potentially Invasive Asian Buprestid Species: *Agrilus mali* Matsumura and *A. fleischeri* Obenberger (Coleoptera: Buprestidae). *Insects*. 11(493):1-12.
- Zablotny, J.E. Discriminating *Agrilus sulcicollis* Lacordaire from *Agrilus cyanescens* Ratzeburg. USDA APHIS. 2pp.
- Zang, K, X. Wang, Z, Yang, K. Wei, and J. Duan. 2016. Biology and Natural Enemies of *Agrilus fleischeri* (Coleoptera: Buprestidae), a Newly Emerging Destructive Buprestid Pest in Northeast China.