



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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Environmental Th**



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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*, *aeocephalus*, *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*, *obtusulus*, *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.



Beginning

Button above takes you to the beginning of the key

Example: 2(1) part 1 of 2



Yellow button with title takes you back to previous couplet

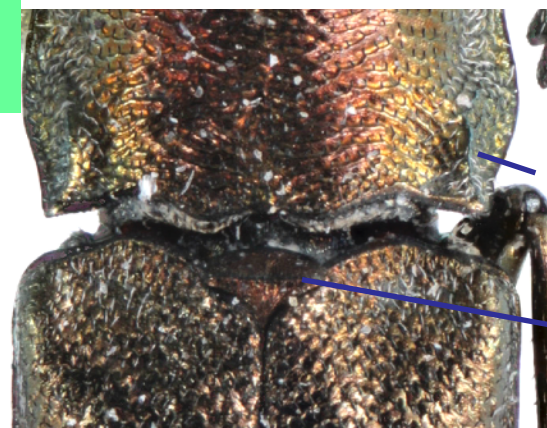
"1 of 2" indicates that there are more images on the second, following slide

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-

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

..... *masculus* Horn

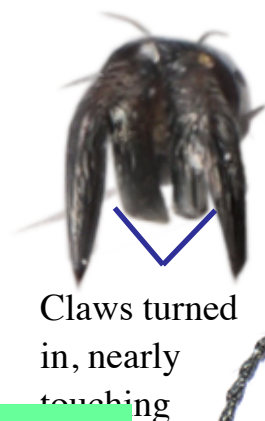


Prehumeral carina distinct

Carina on scutellum

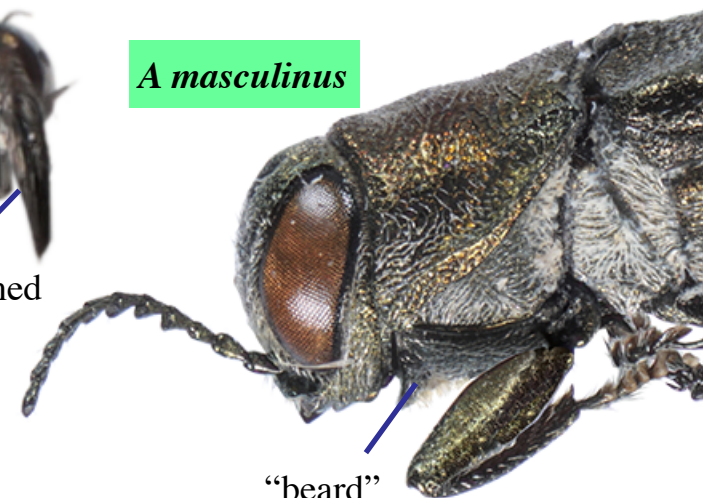


No "beard" although setae present



Claws turned in, nearly touching

A masculinus

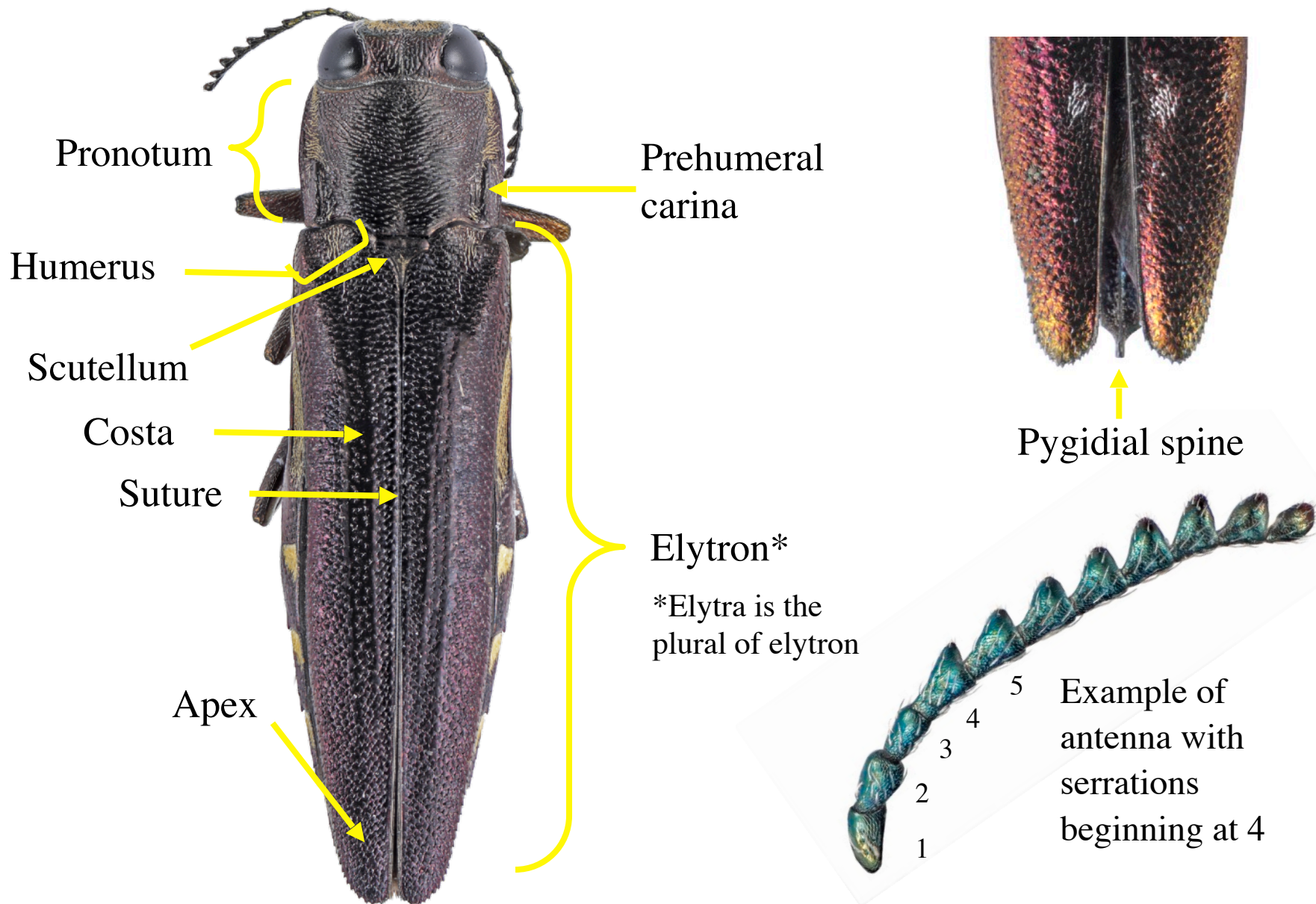


"beard"

A ventralis

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

BASIC BODY PARTS OF BUPRESTIDS: I

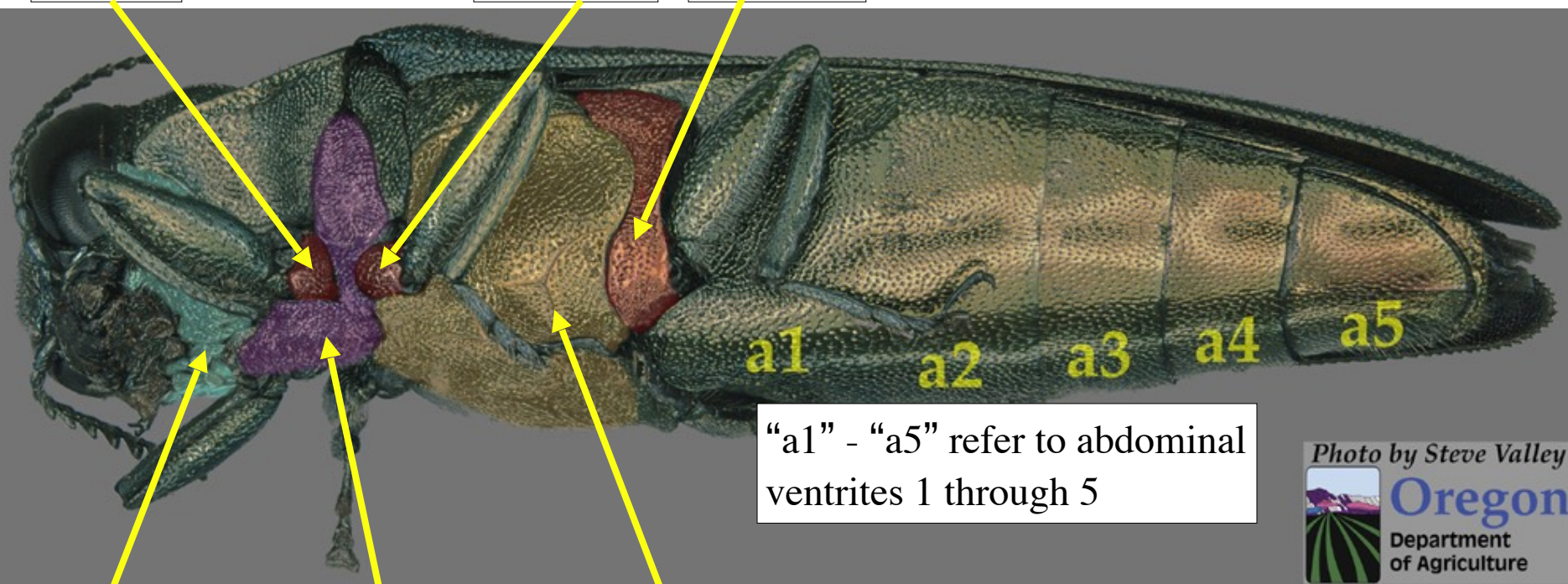


BASIC BODY PARTS OF BUPRESTIDS: II

Procoxa

Mesocoxa

Metacoxa



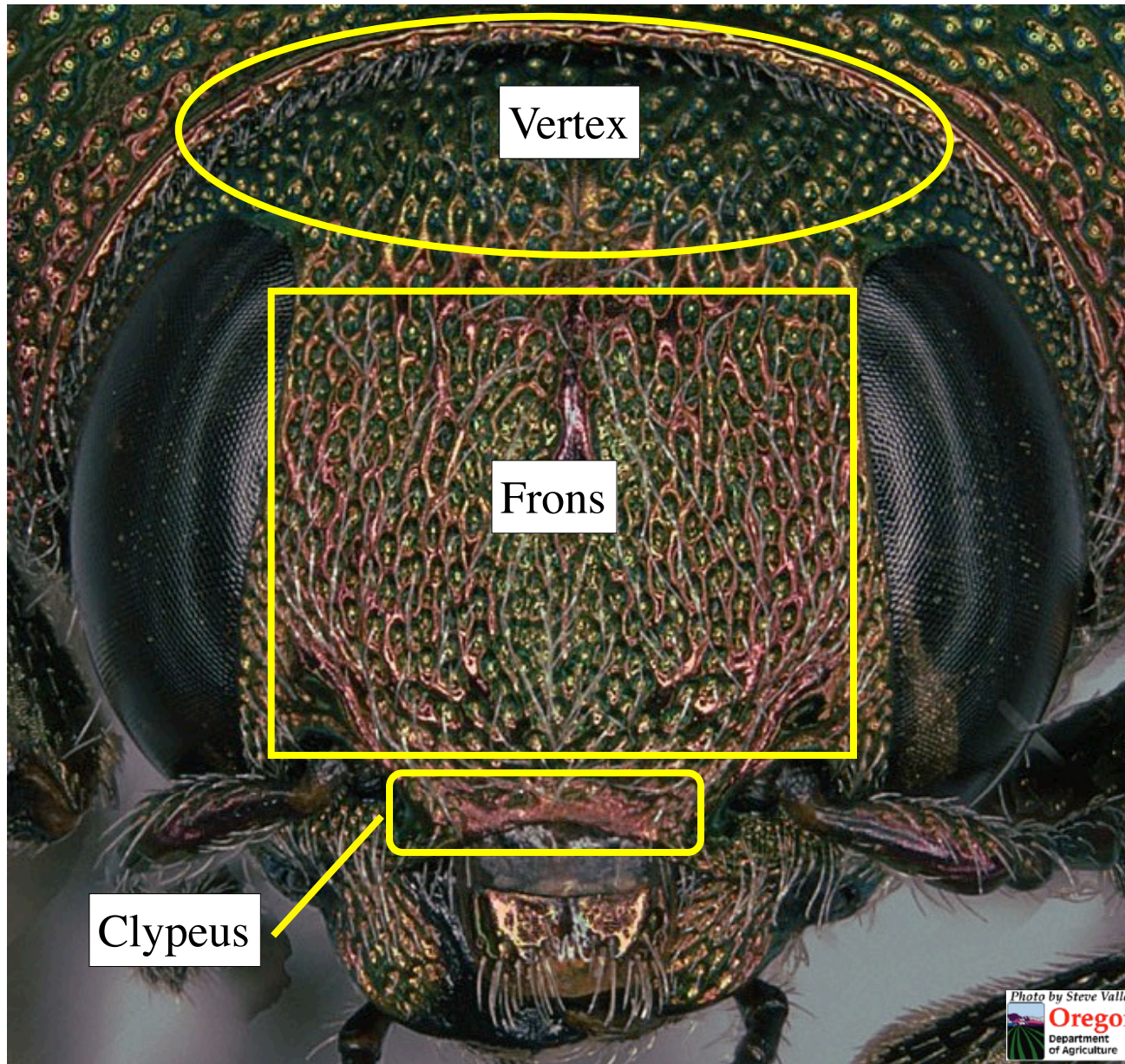
"a1" - "a5" refer to abdominal ventrites 1 through 5

Prosternum

Mesosternum

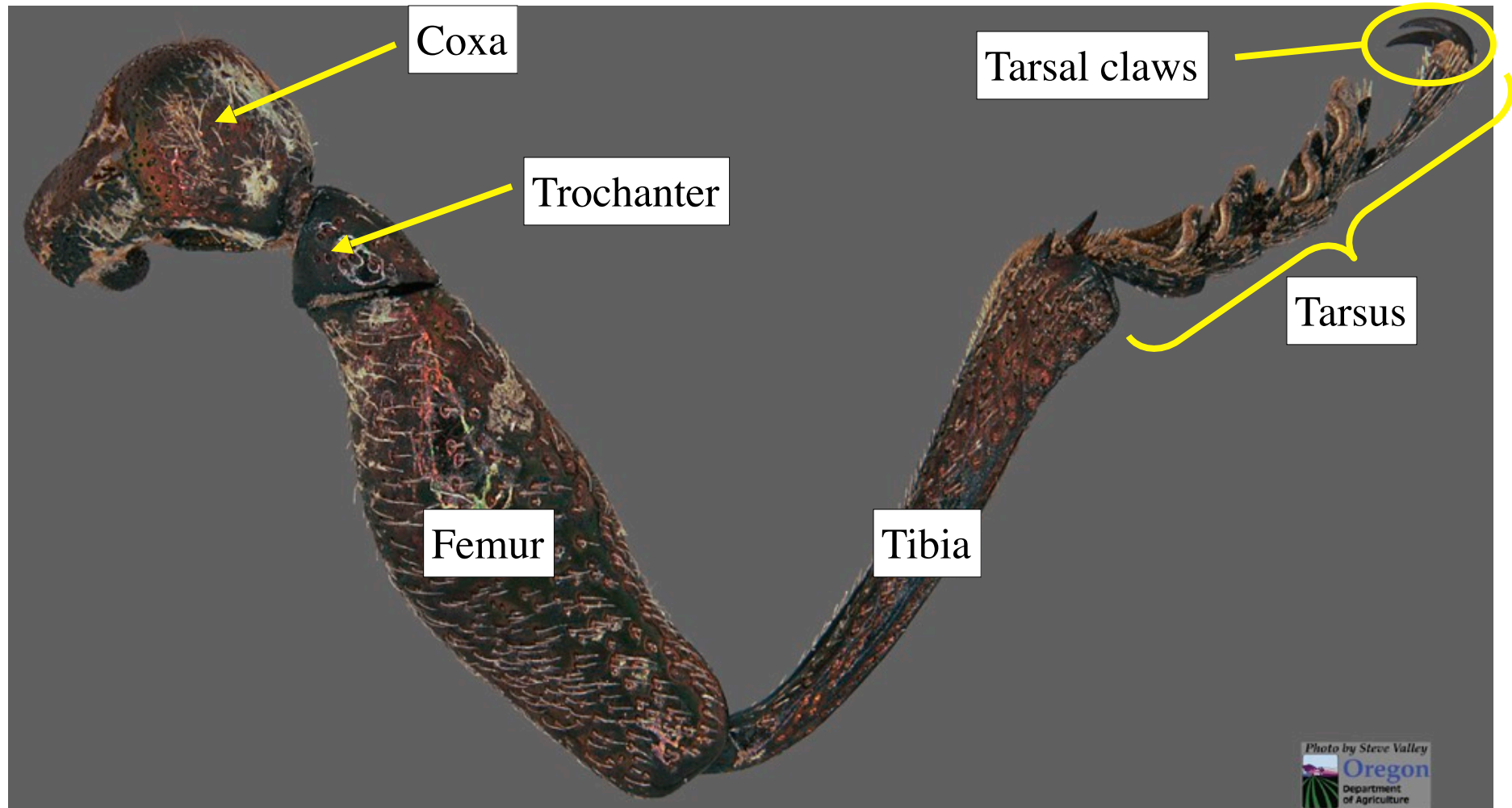
Metasternum

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



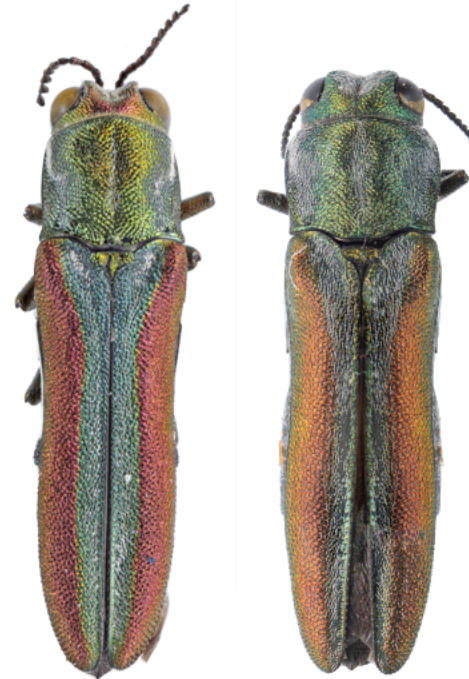
Agrilus species covered in this Guide

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

Comparative Plate 1 of 9



vittaticollis



pulchellus

utahensis

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

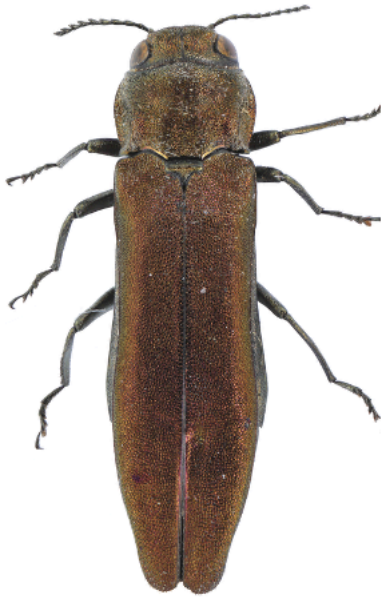
hyperici

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



obsoletoguttatus



fallax



fleischeri



lecontei



Image from Jendek and Grebennik 2011

auriventris



auriventris



egeniformis



paracelti



egeniformis



paraimpexus



fleischeri



mali male



biguttatus



biguttatus



bilineatus



pubifrons



felix



malvastri



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



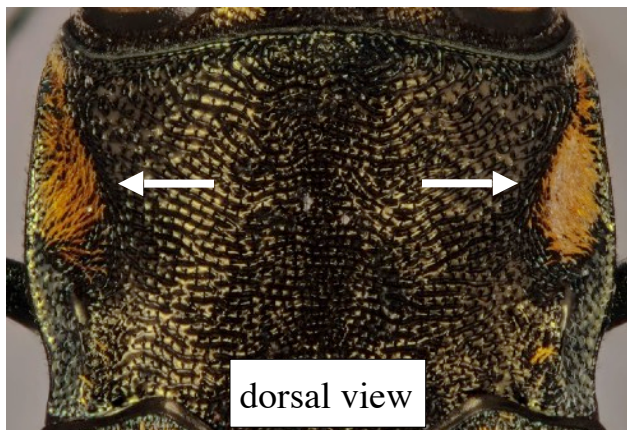
1: Part 2 of 3

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)*

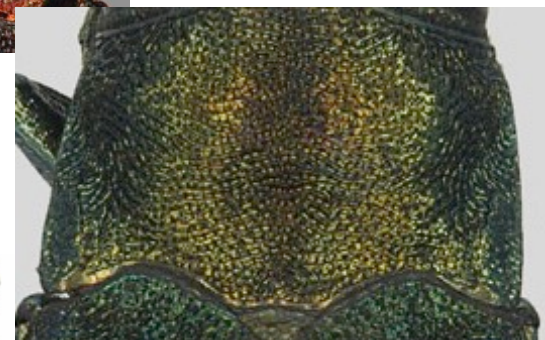
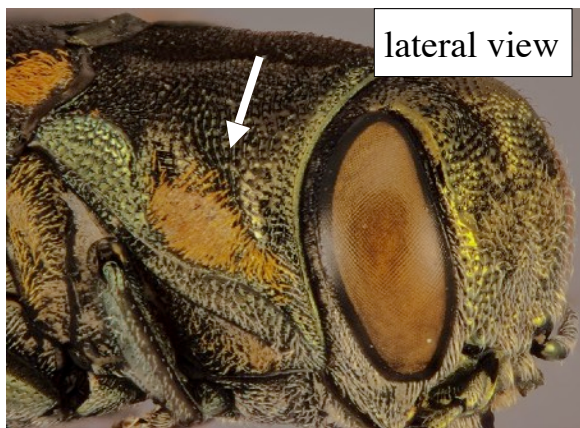


*Rare specimens of *A. g. granulatus* may key here.

Elytra and dorsum of pronotum without distinctly orange pubescent patches 2



Dorsum of pronotum with patches of orange pubescence.



Pronotum without dense patches of pale pubescence.



1: Part 3 of 3



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



Beginning

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





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



A planipennis



lacustris



cuprescens



acutipennis



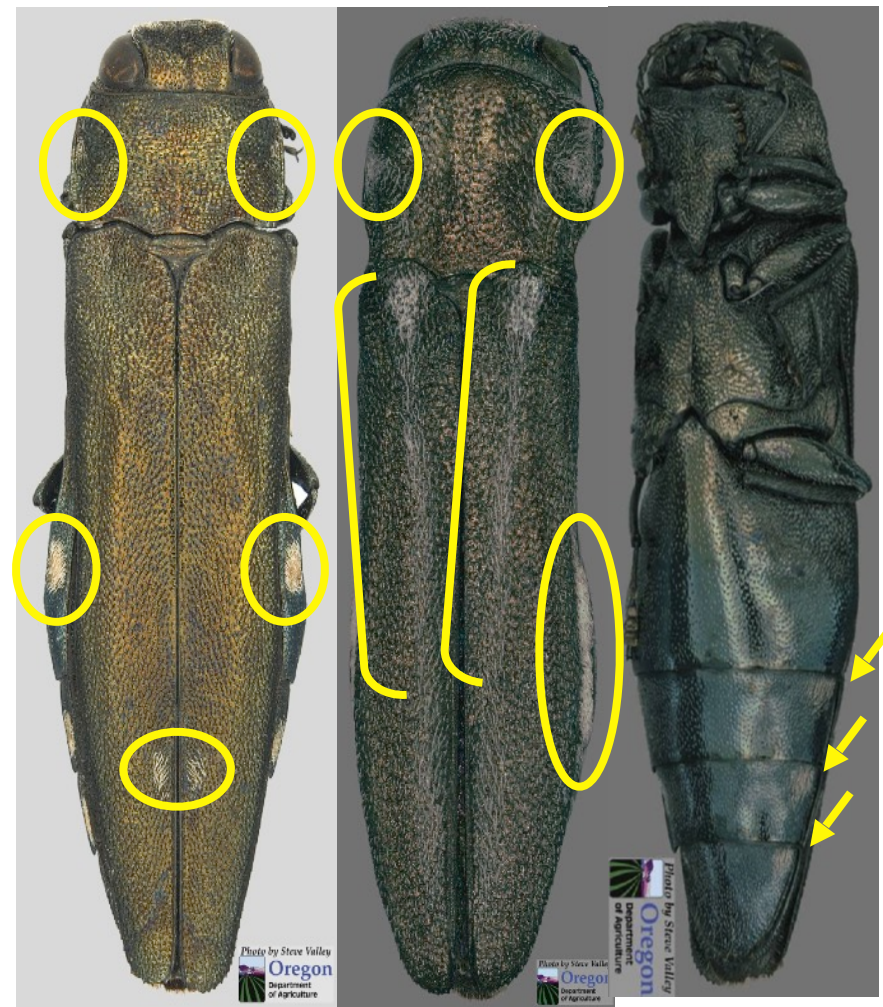
8 (7)



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
Oregon
Department
of Agriculture



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

Photo by Steve
Oregon
Department
of Agriculture



10 (9)



Pygidium with spine projecting beyond margin11

No spine on pygidium 13



A bilineatus



A masculinus



11 (10) part 1 of 2

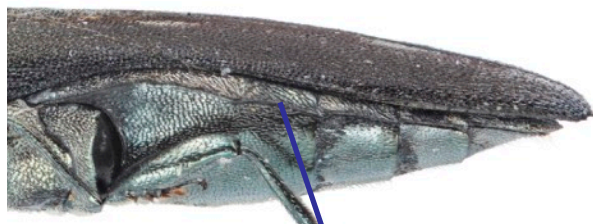
11. Elytral apices angulate with a spine on angle; markings typically as spots; prehumeral carina distinct; lateral abdomen spotted except segment 2; 7.3-12mm; *Populus* spp.; Asia including Russia and eastern Europe. Not native to North America: Report! *fleischeri* Obenberger, China poplar borer

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

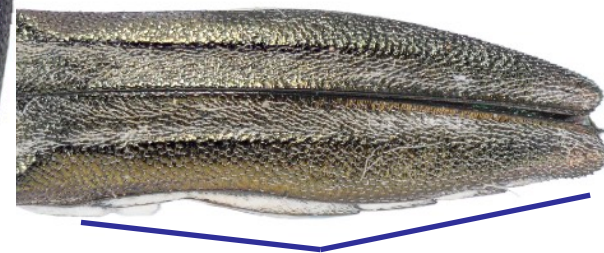
A. fleischeri



Second segment without pale setal spots



A. bilineatus



All lateral sclerites with spots of pale setae



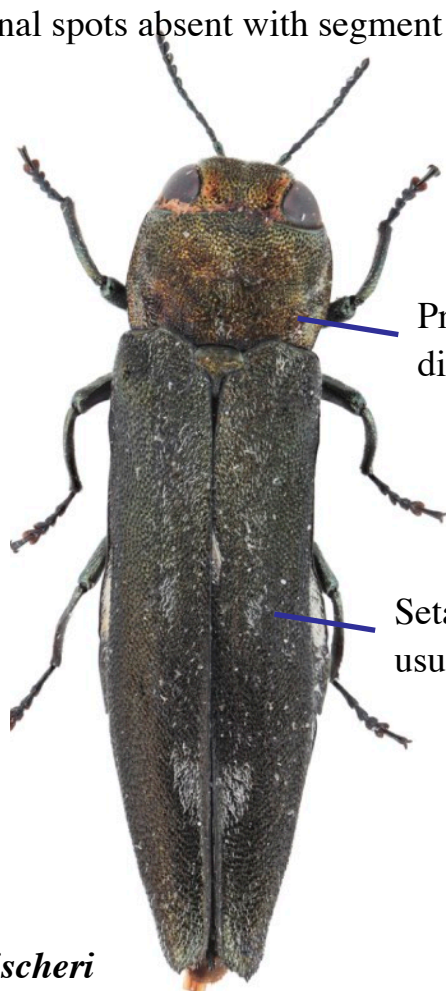
11 (10) part 2 of 2

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

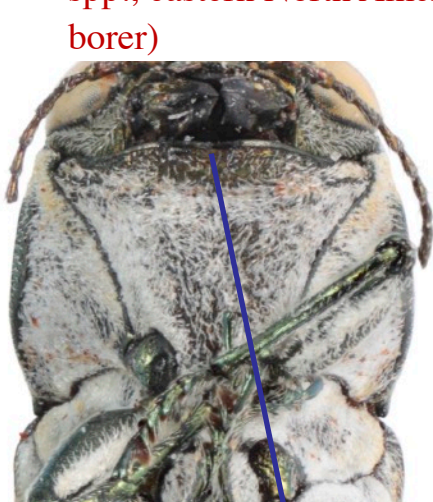
Setal patches
usually as stripes

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

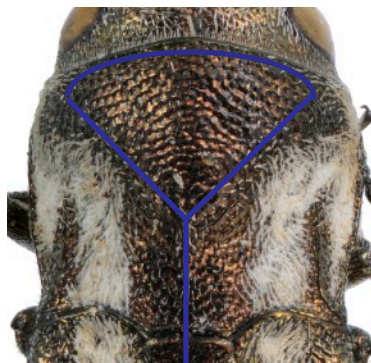


A. bilineatus

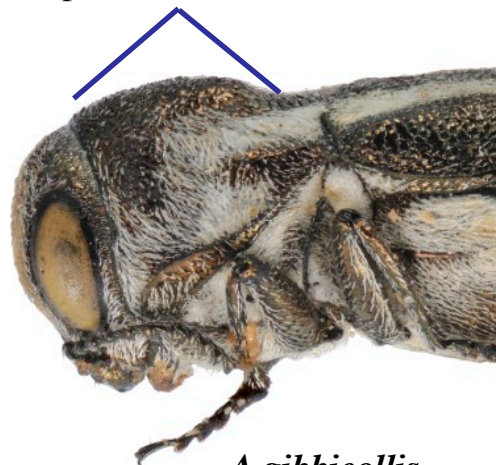


Pronotum raised in a triangular shape anteriorly (gibbose); 4.6-6.6mm; host unknown; AZ, CA, CO, KS, MT, NM, NV, OK, TX, UT, and WY *gibbicollis* Fall

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

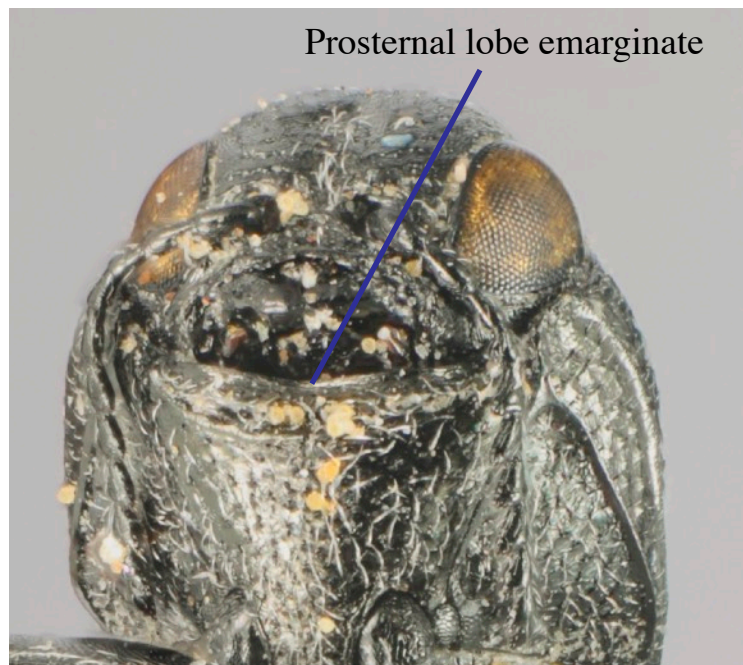
14 (13)

14. Antennae serrate from 4; prosternal lobe emarginate 15

Antennae serrate from 5; prosternal lobe variable 16

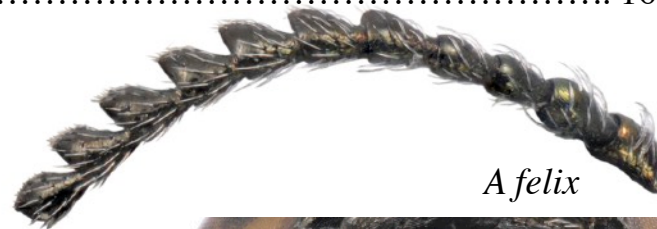


A. masculinus



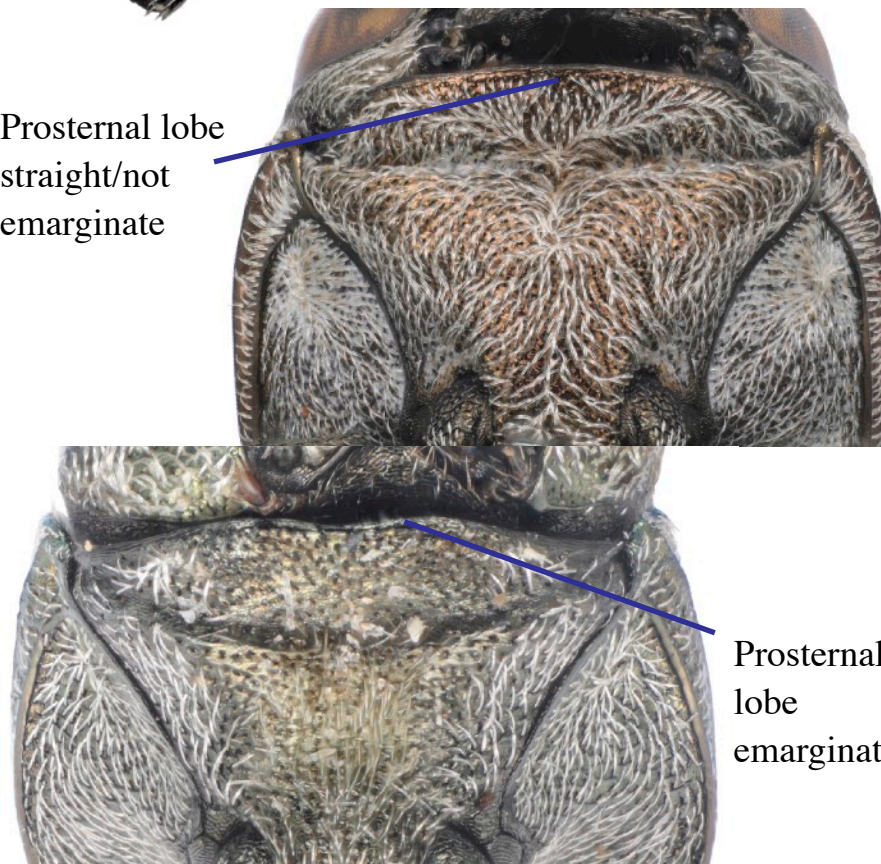
Prosternal lobe emarginate

A. ventralis



A. felix

Prosternal lobe
straight/not
emarginate



Prosternal
lobe
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

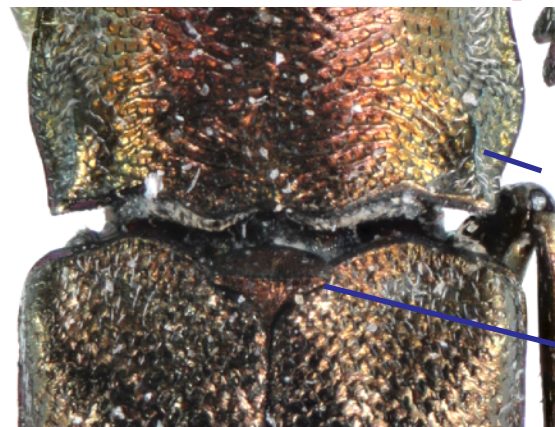


Claws simple with small tooth

No "beard" although setae present



A ventralis

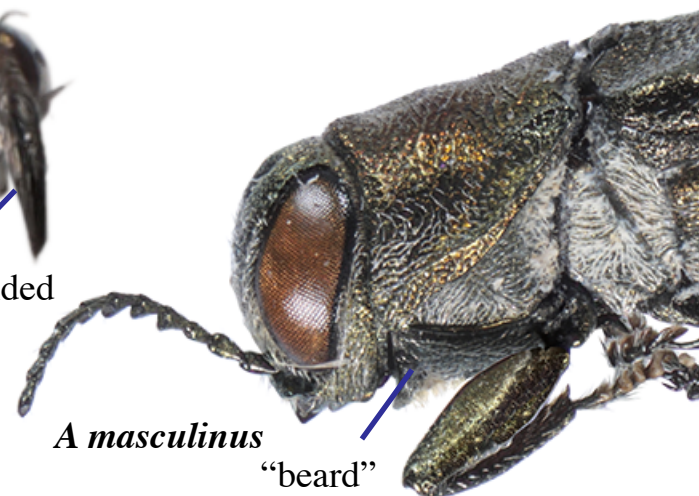


Prehumeral carina distinct

Carina across scutellum



Claws divided



A masculus

"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

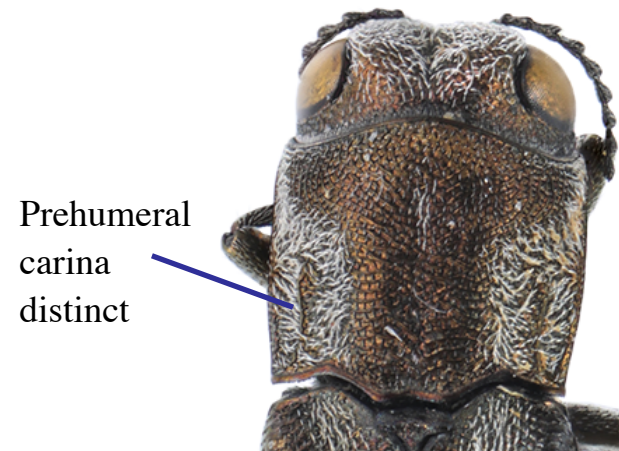


Prehumeral
carina absent



Prehumeral
carina weak
and irregular

A blandus



Prehumeral
carina
distinct

A illectus

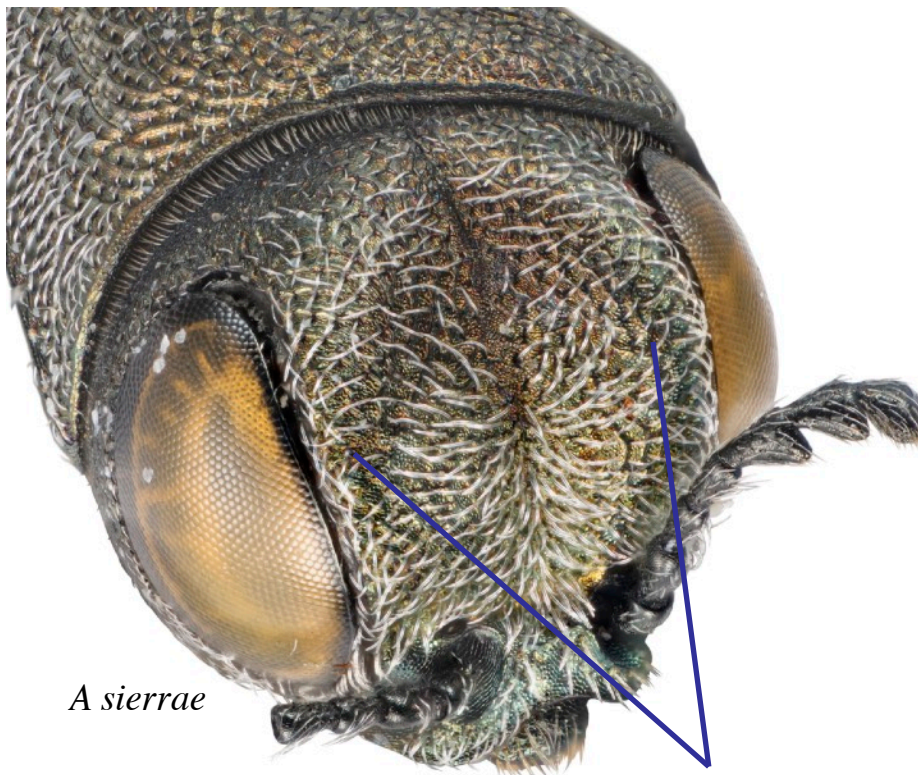


A sierrae

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



Impressed
area

A illectus



A sierrae



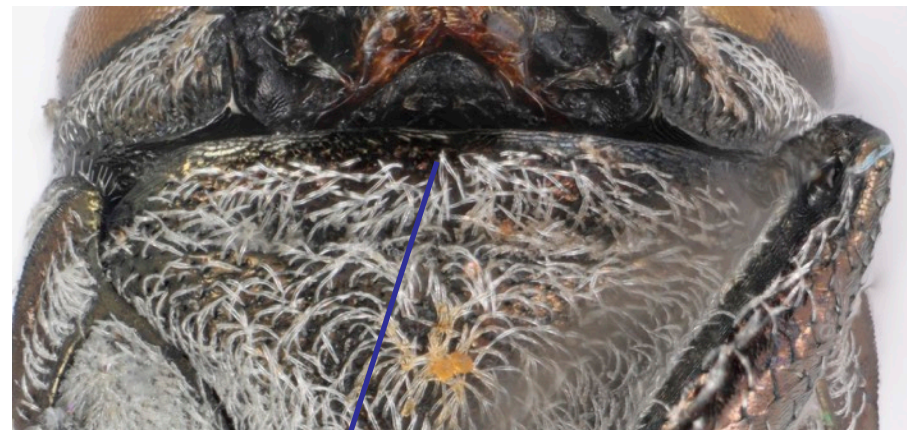


19. Prosternal lobe emarginate 20

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. 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

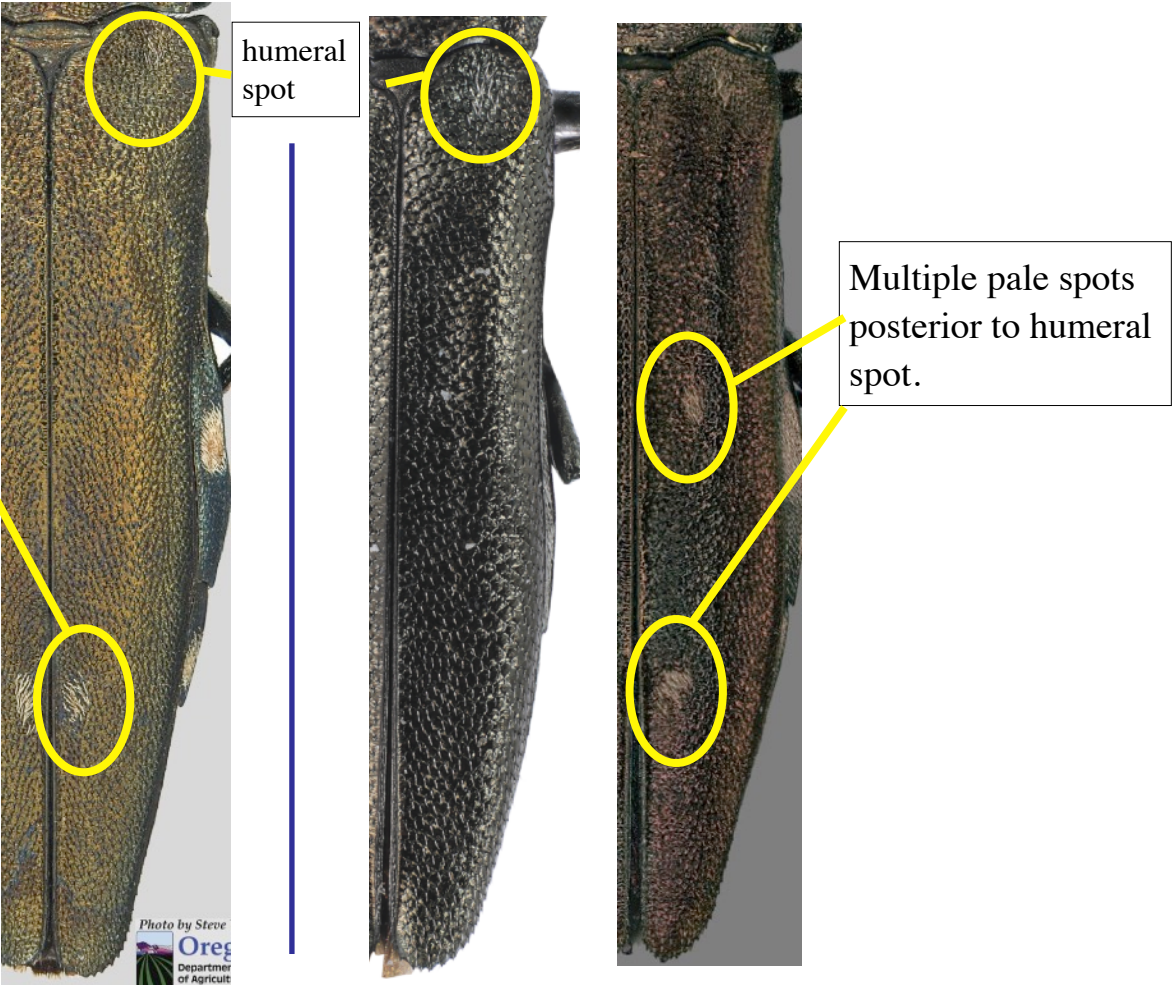




22 (9)

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 



Single pale spot after humeral spot.

humeral spot


Multiple pale spots posterior to humeral spot.



23 (22)



With one elongate spot at 2nd 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 spots25

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

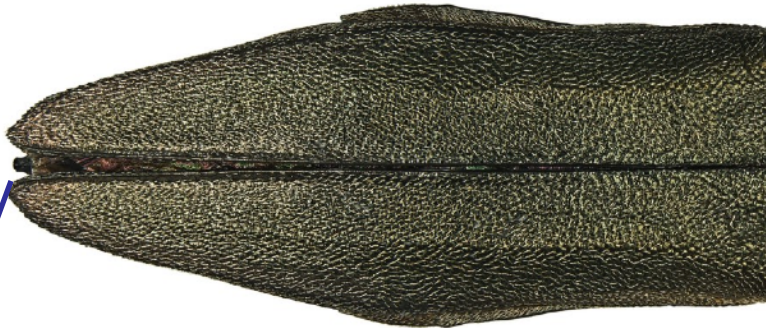


Pygidium with spine 63



A. difficilis

Present



A. anxius



A. quadriguttatus quadriguttatus

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

No pygidial spine; elytral apices rounded28 



A quadriguttatus quadriguttatus



A granulatus populi

A mali male



A walsinghami



A mali female

27. Frons with setae not obscuring surface35

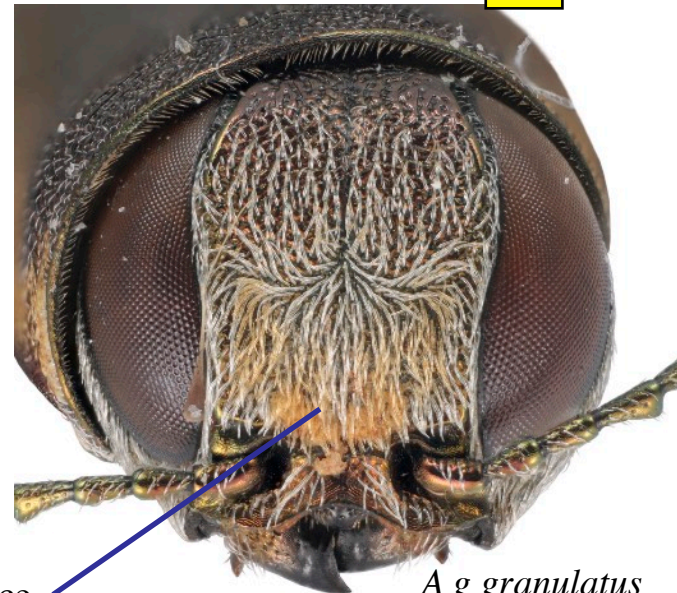
Frons with dense setae at least partially obscuring surface36



A q. quadriguttatus

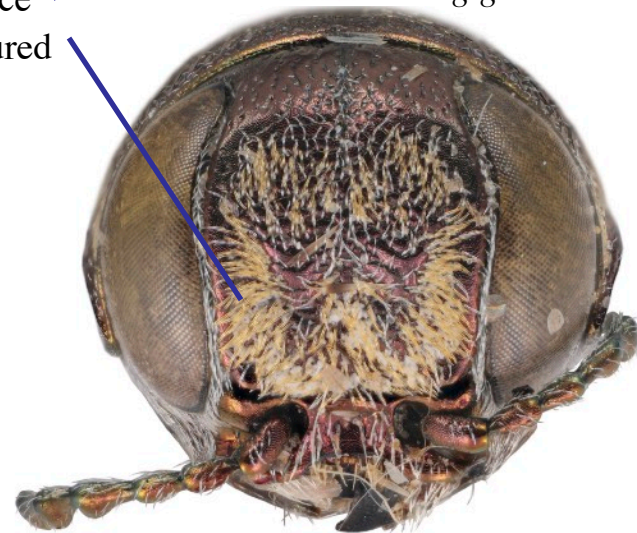


A fleischeri



A g granulatus

Surface
obscured





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

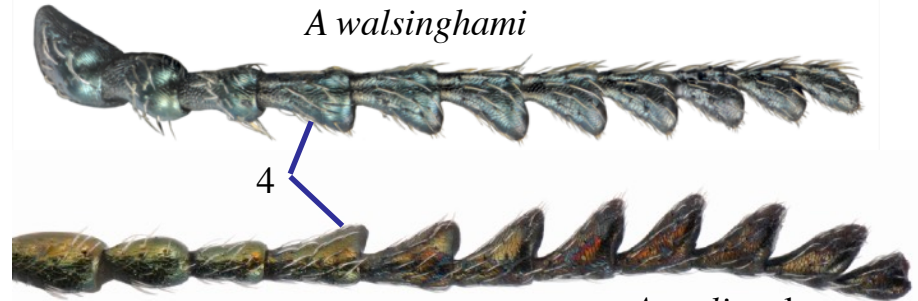
Antennae serrate starting at 4; prosternal lobe emarginate. 4-13mm 32



A paraimpexus



A walsinghami



A mali male



A egenus



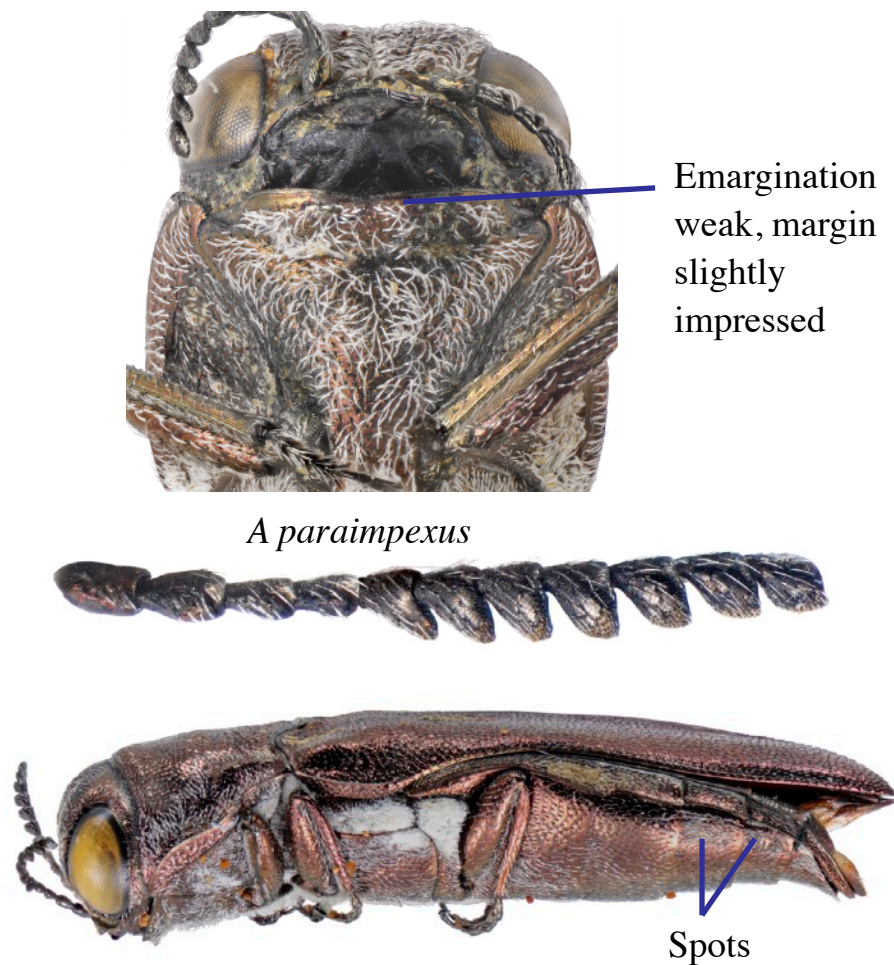
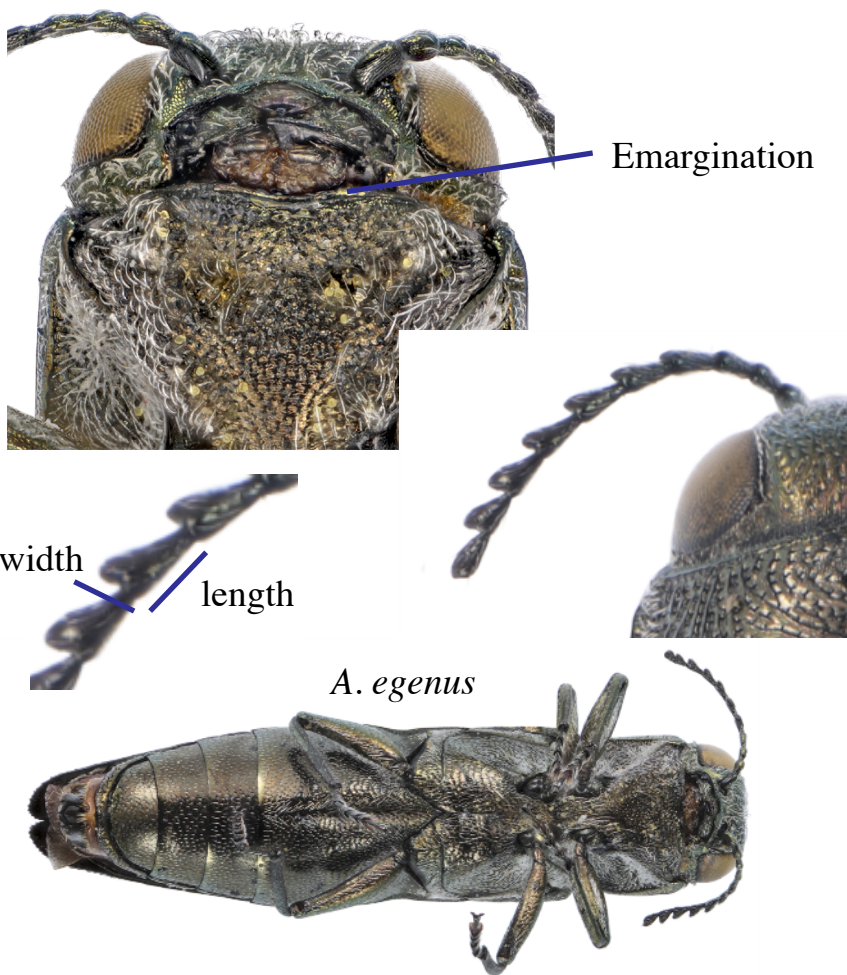
A walsinghami



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





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* Hespeneheide



A impexus



A paraimpexus

32 (28) part 1 of 2

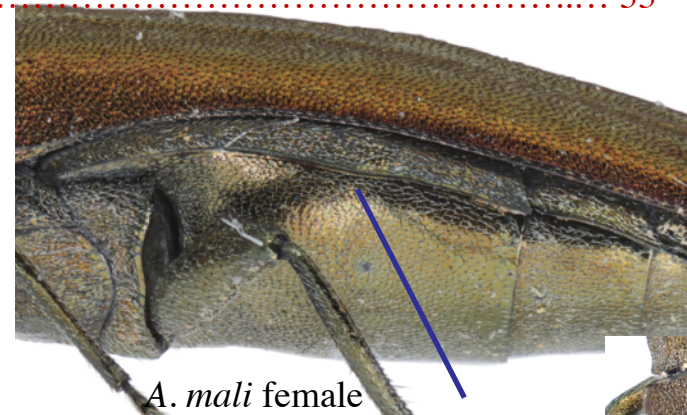


32. Abdominal segments 1 and 2 separate laterally; elytra with distinct costae; prehumeral carina variable but usually indistinct; 9-13mm; *Chrysothamnus nauseosus*; western N. America to AZ and NM*walsinghami*
Crotch

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



Segments separate



A. mali female

Segments fused



A. mali male





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 





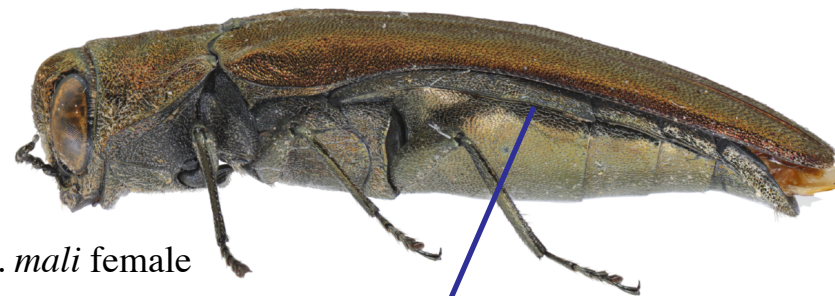
33 (32) part 1 of 2

33. Lateral abdominal sclerites with spots except for 2nd ; 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 2nd 34 

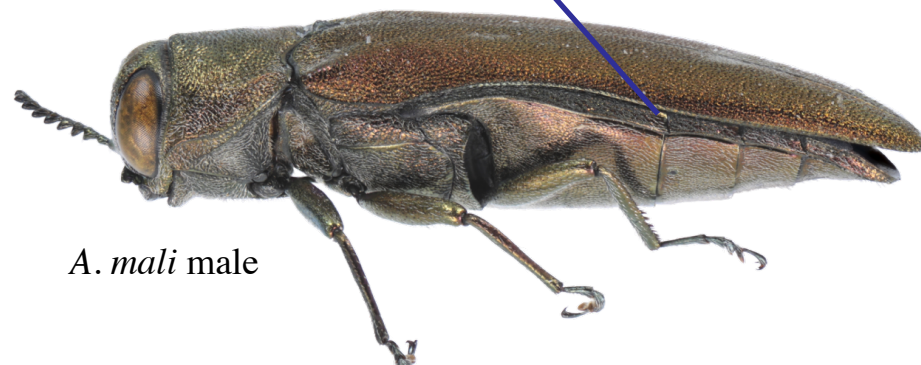


Lateral sclerites of 2nd segment mostly bare



A. mali female

Lateral sclerites of 2nd 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

Spots

A. fallax



Smooth in upper 1/3

male

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* Matsumura



A. fallax



A. mali female

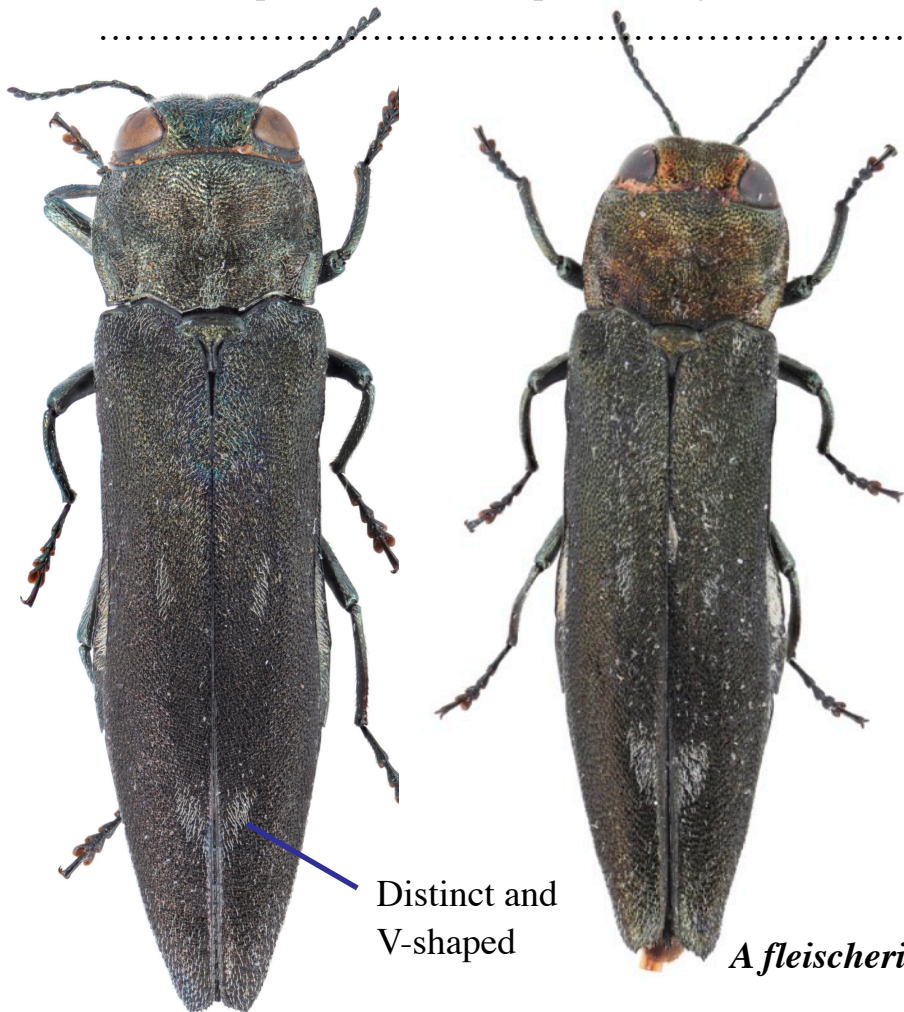


A. mali male



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* Gorv



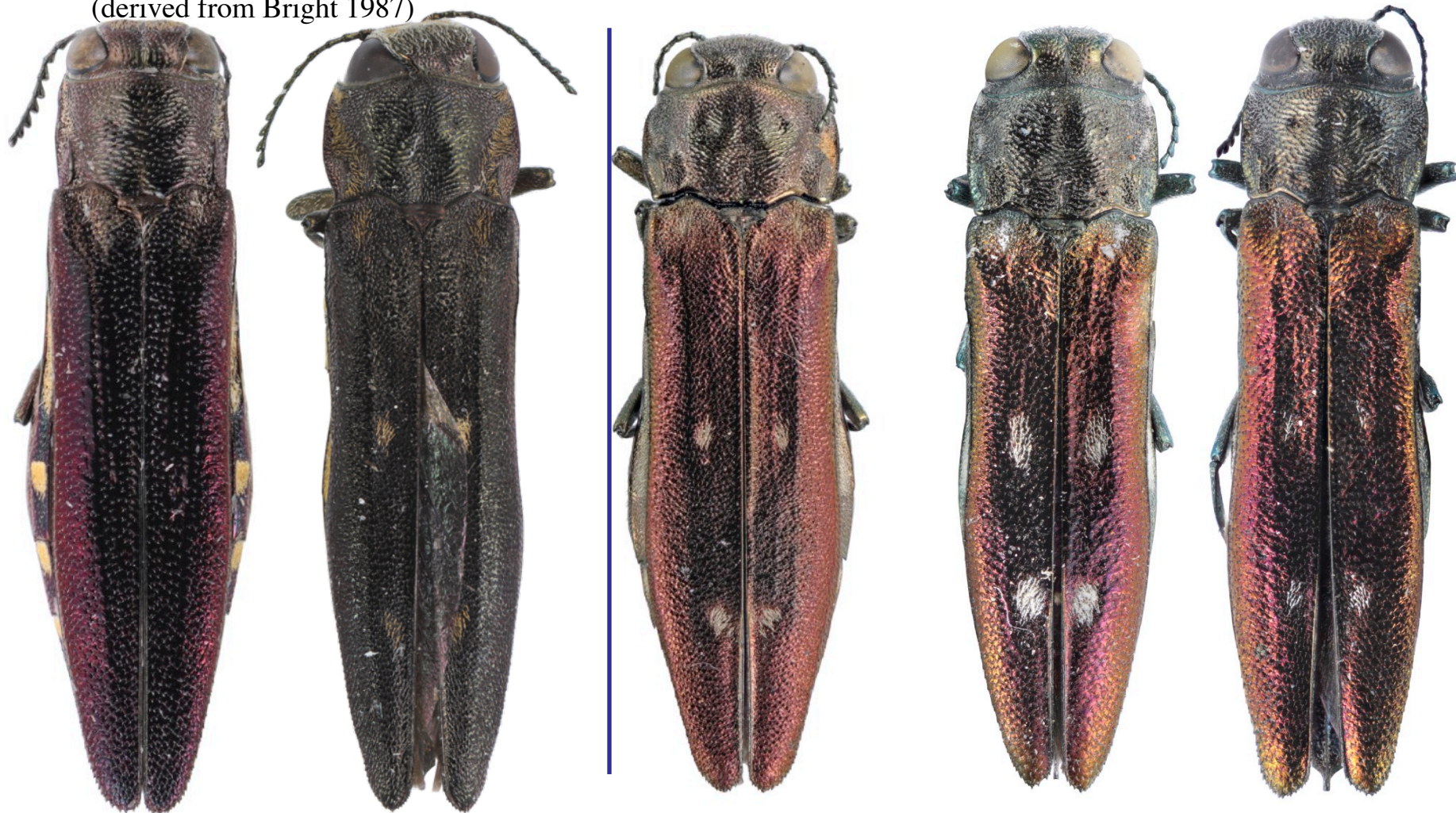
A quadriguttatus quadriguttatus
female by Jason Hansen, <https://bugguide.net/node/view/1890494/bgimage>





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

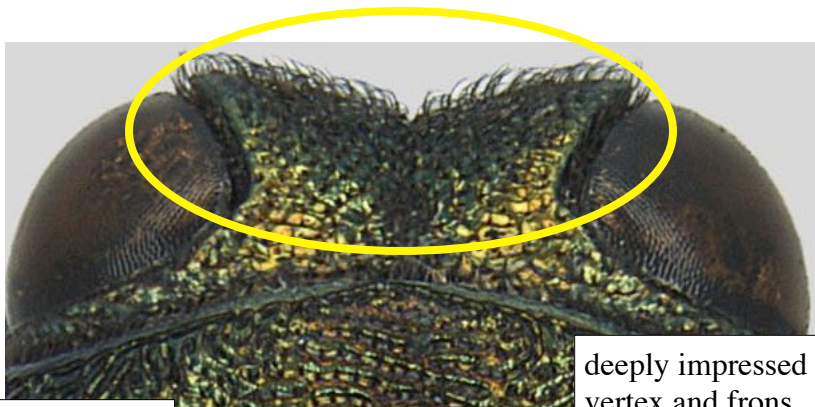


A planipennis

39 (38)

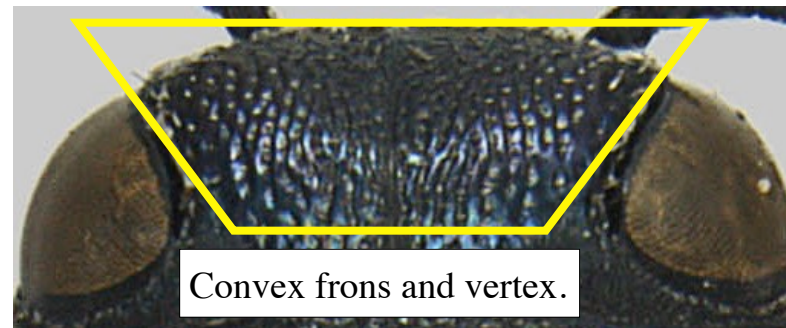
Vertex and frons flat to impressed, deeply impressed and concave dorsally 40

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

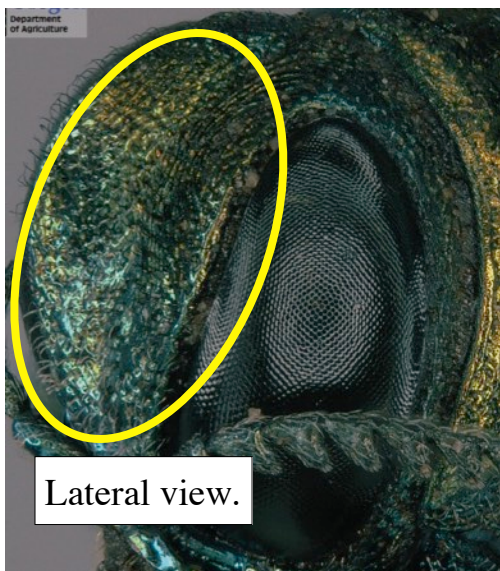


deeply impressed
vertex and frons

Dorsal view.



Convex frons and vertex.



Lateral view.



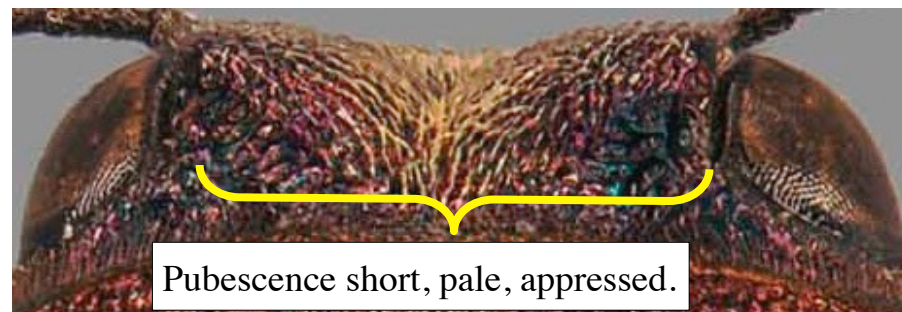
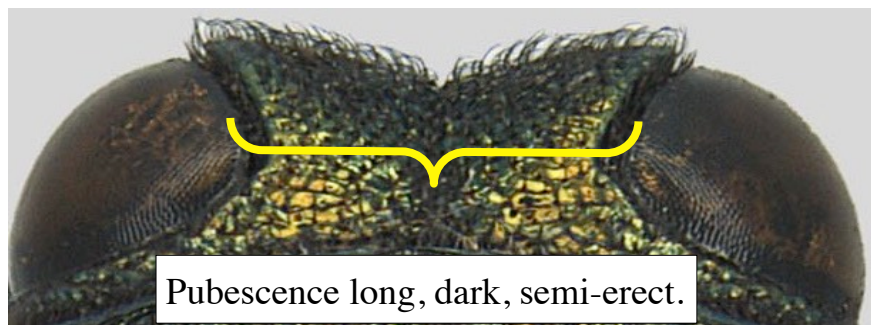
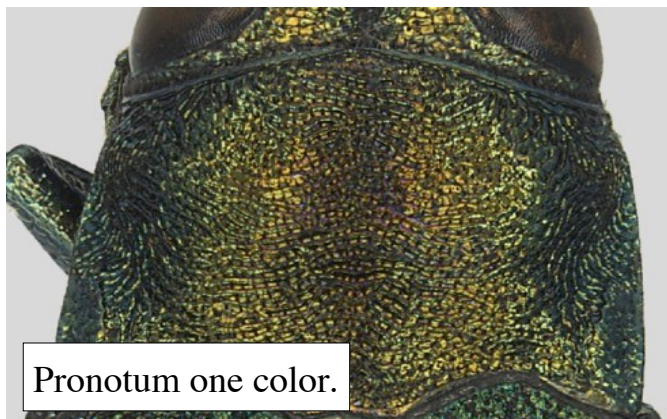
Finely impressed frons and vertex.



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





40 (39) part 2 of 2

Agrilus *planipennis* Fairmaire, the Emerald Ash Borer



Color morph likely caused
by trap stickum or
extraction method



41 (40) Part 1 of 2



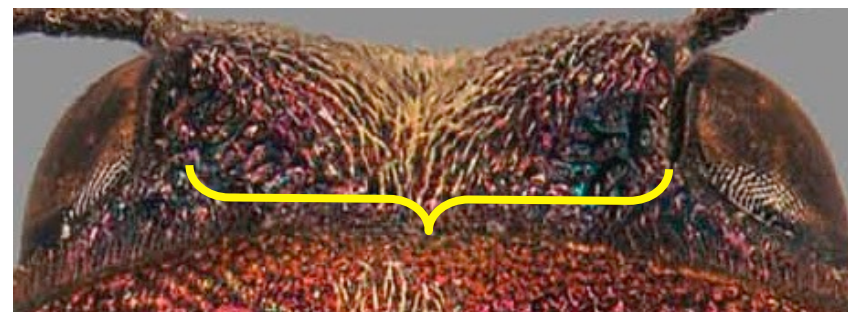
Pronotum all one color, metallic red or bronzy red; from dorsal view, frons with long, dark pubescence; smaller: 4-7mm; *Rubus* spp.; eastern North America to TX introduced to CA. Not in most of the western US: Report!

..... *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.



41 (40) Part 2 of 2



A. ruficollis

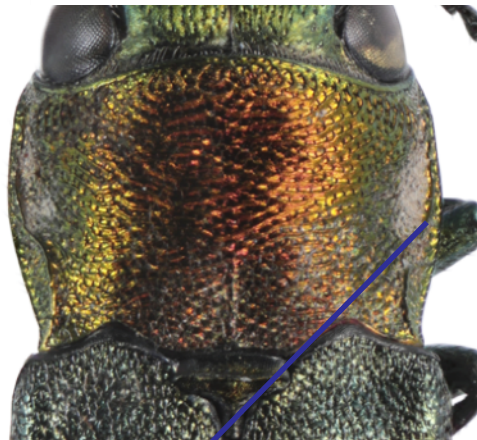


A. vittaticollis



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

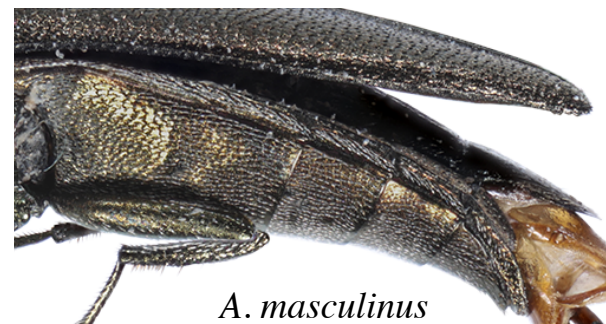
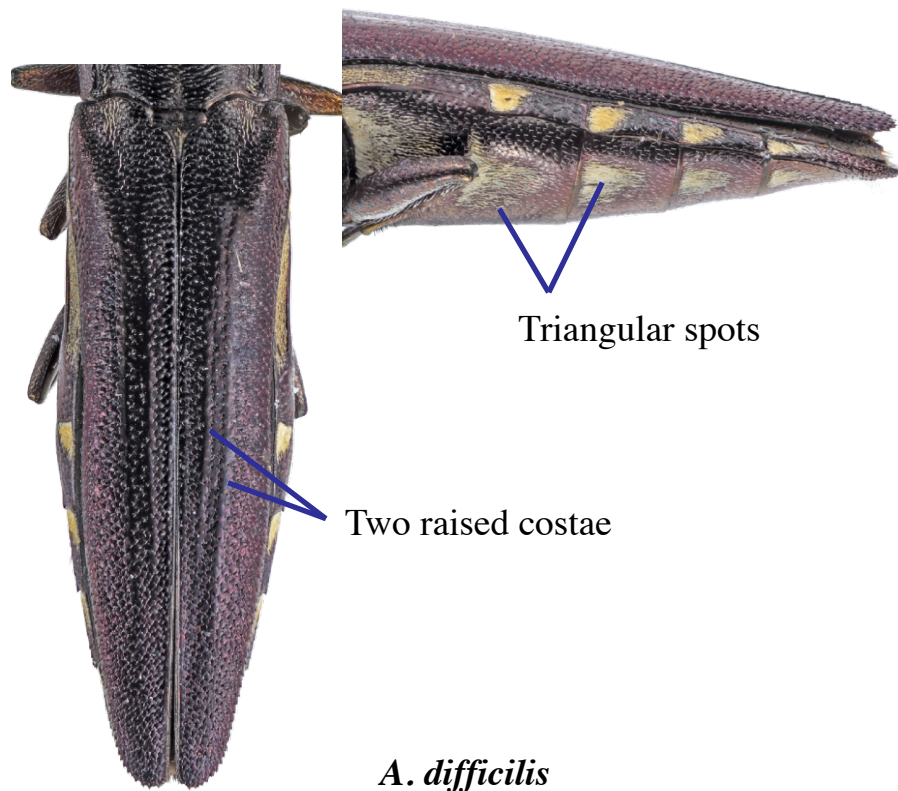


A. difficilis

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 



A. difficilis



Interior margin of claws turned in but not touching. *A. crataegi* pictured.

Well defined notch



A. abditus



A. masculinus





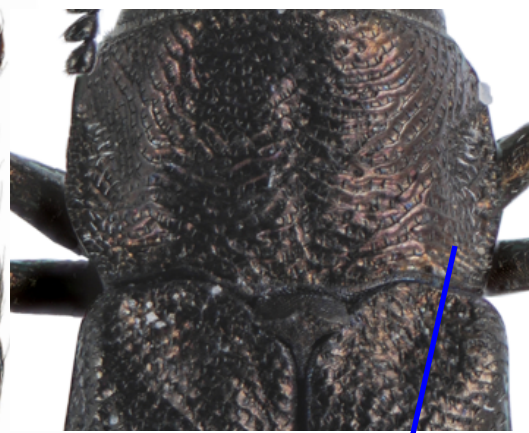
43 (42) part 3 of 3



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



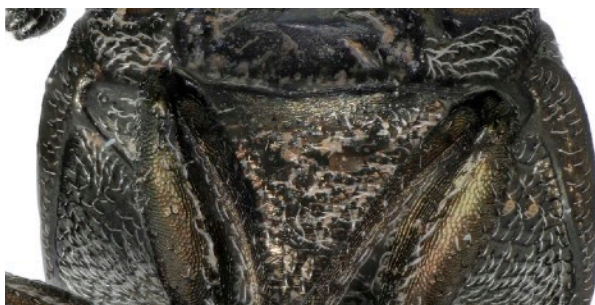
45 (44)

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

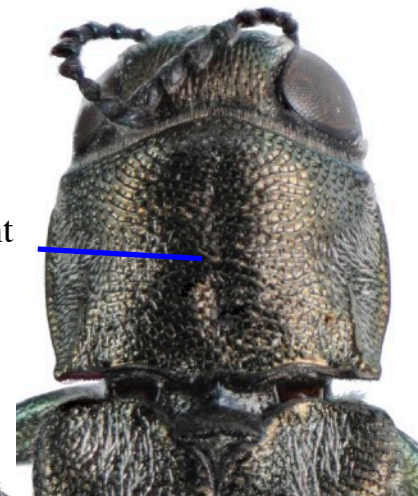
Pronotal median impression variable, although if present then usually interrupted at middle; prosternal lobe emarginate (rarely truncate in *A. politus*) 46



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



Median impression present but interrupted at middle



A paracelti



A egenus



Beginning

46 (45)



46. Antennae serrate from 5, not native to western North America47

Antennae serrate from 4, native species 48



A paracelti



5



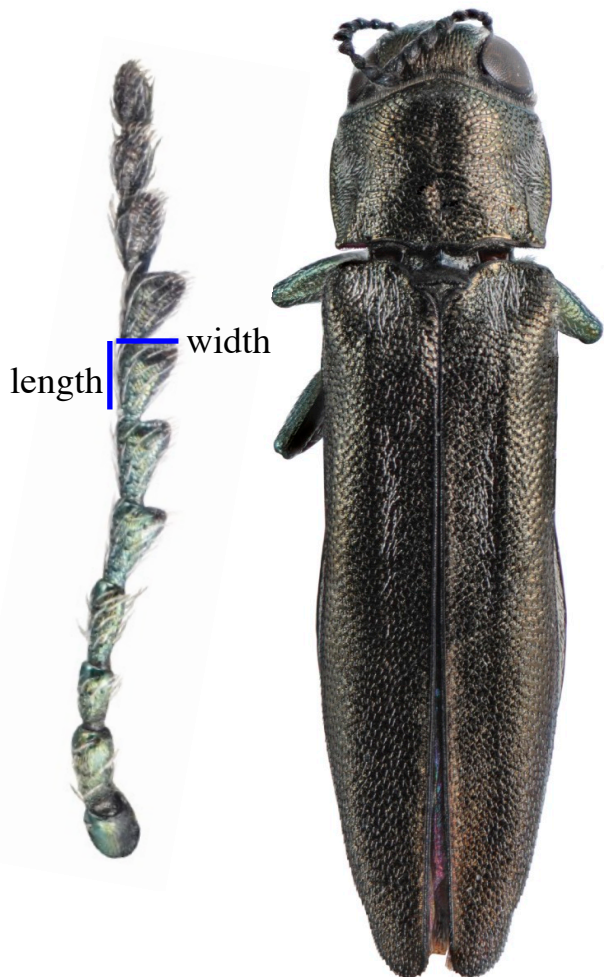
4

A masculinus

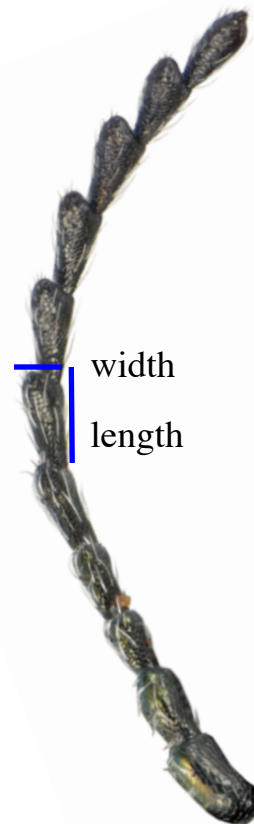
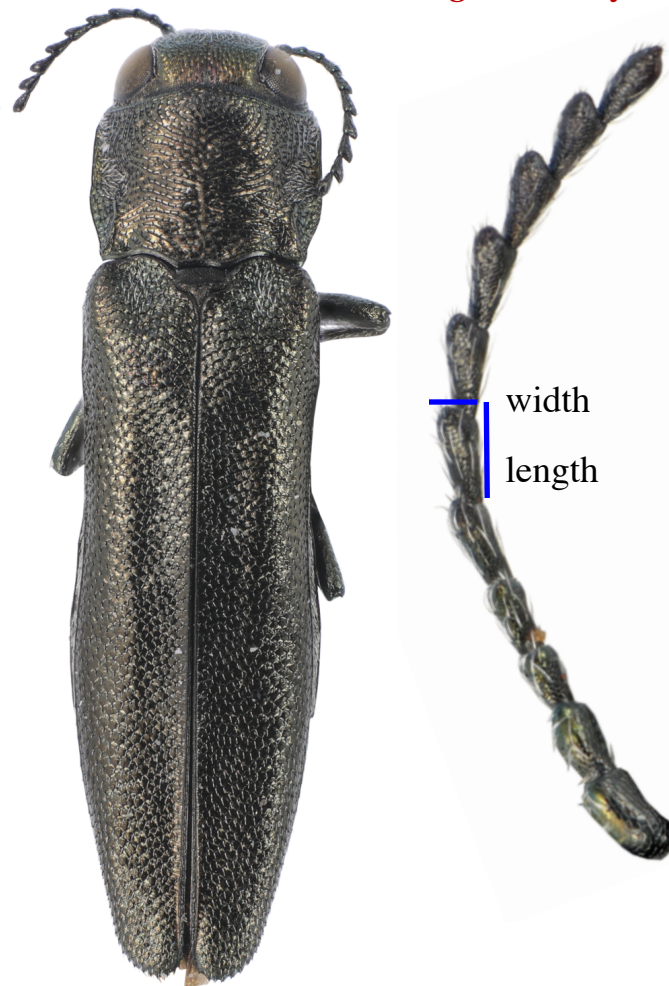
47 (46)

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

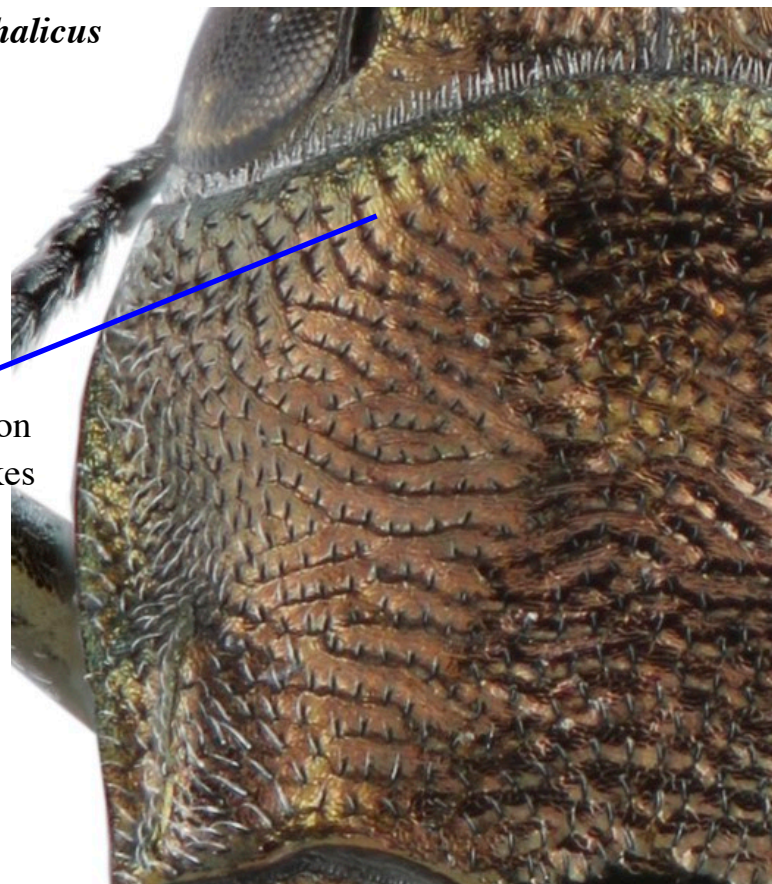
Black, blue, green, red copper, or gold, some forms bicolored usually with a bronze pronotum and reddish copper elytra; pronotal rugae smooth and shiny; prosternal lobe truncate to weakly emarginate: 4.7-8.5mm; hosts *Acer* and *Salix* spp.; widespread ***politus*** (Say) (willow gall limb borer)

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 cephalicus

Minute
sculpture on
rugae makes
it appear
duller



A politus



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



A politus



A cephalicus





51 (39)

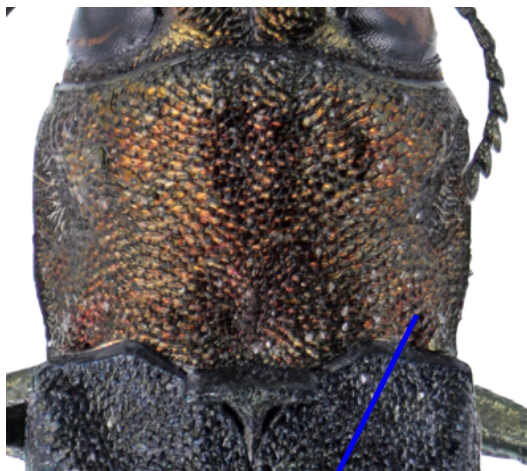


Prehumeral carina absent; bicolored with elytra black (sometimes with blue sheen) and pronotum coppery to green-coppery; 5.75 to 8.75mm; *Quercus utahensis*; AZ, CO, NM, UT..... *quercicola* Fisher

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



A quercicola



Prehumeral carina absent



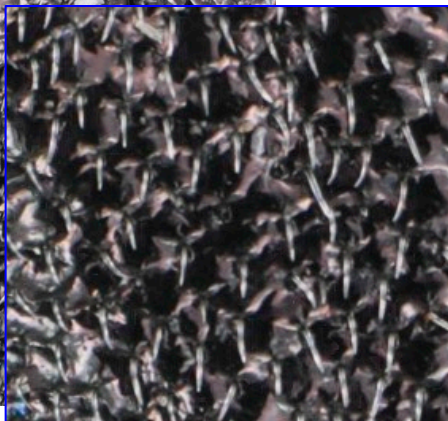
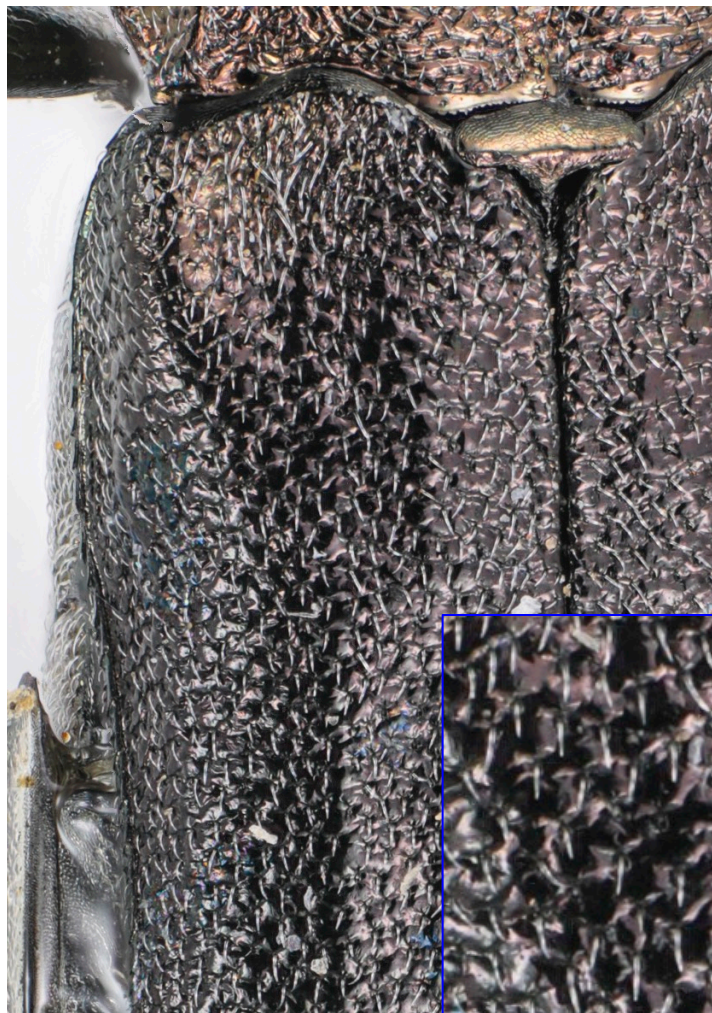
A anxius



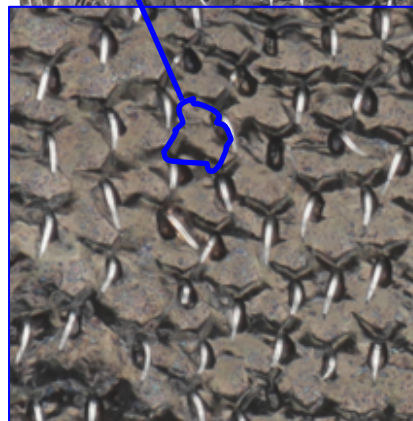
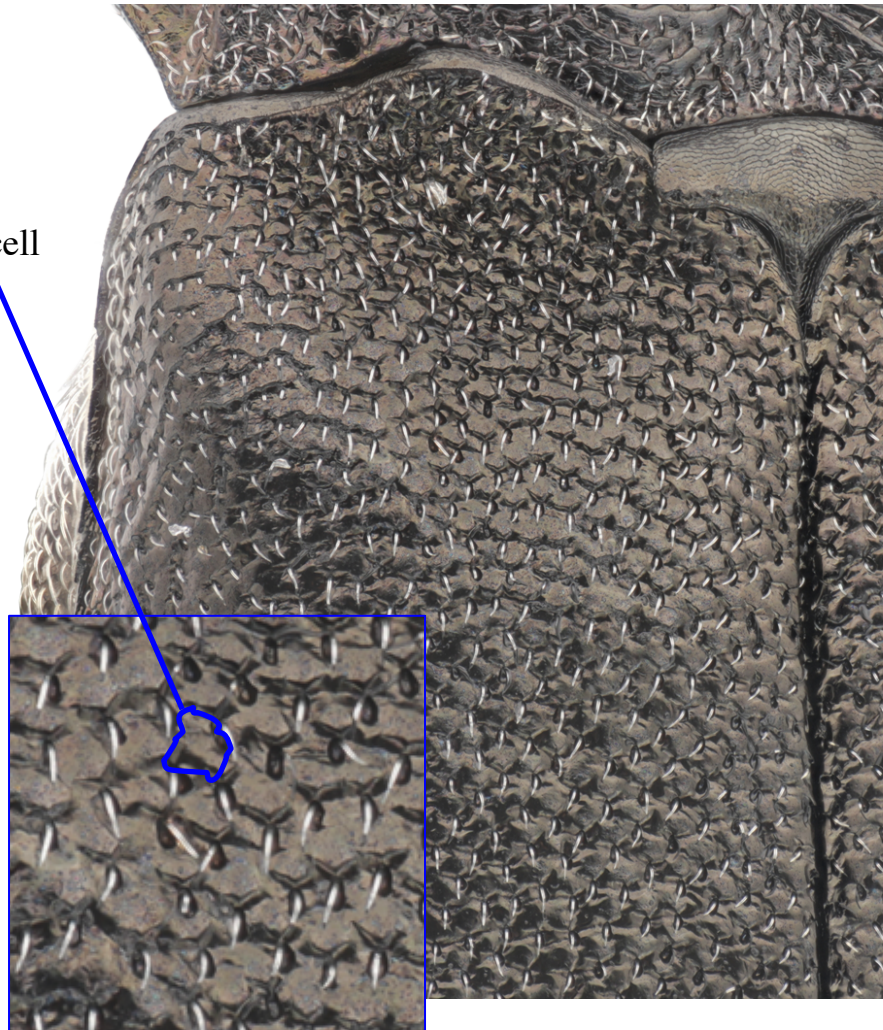
52 (51)

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

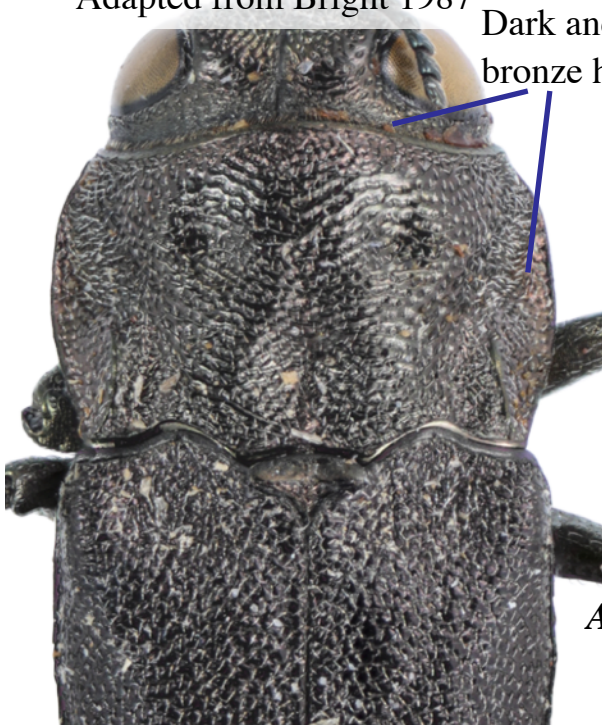


53 (52) part 1 of 2

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



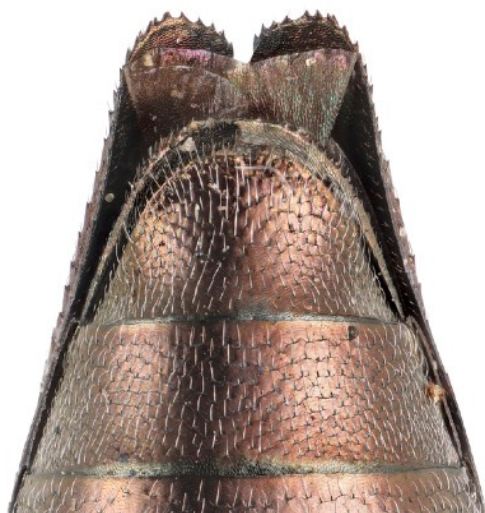
55 (54)

Last ventrite not emarginate 56

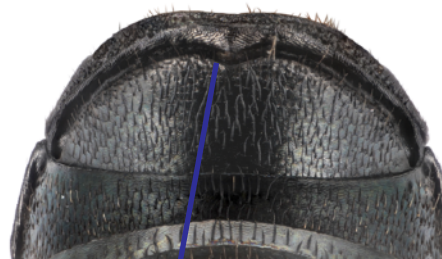
Last ventrite emarginate 77 



A abditus



A politus



Emargination



A cyanescens



A sulcicollis

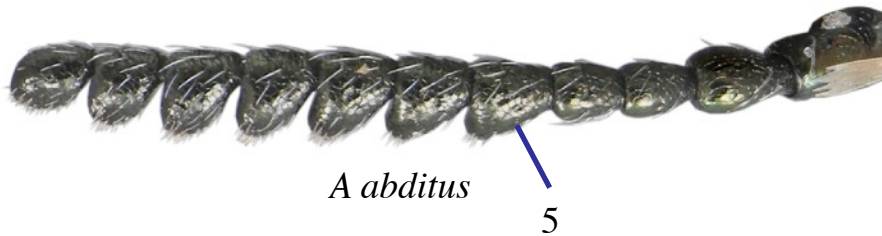


56 (55)



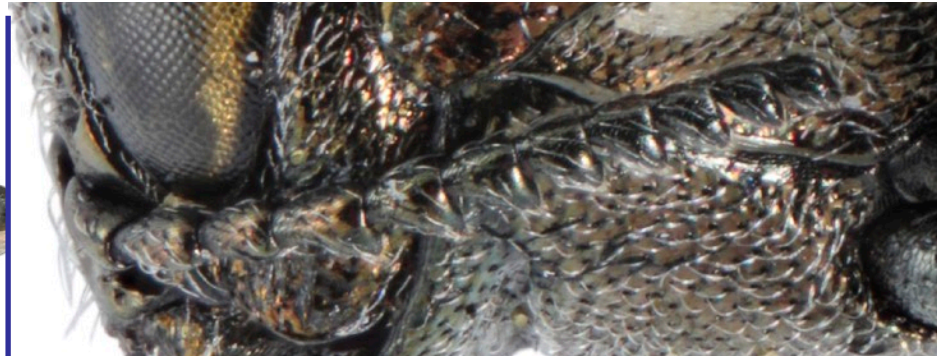
56. Antennae serrate from 5 57

Antennae serrate from 4 67

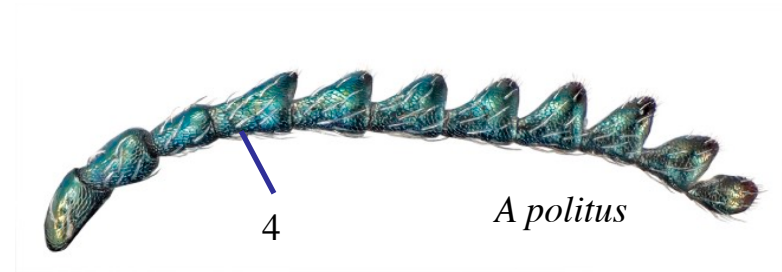


A. abditus

5



A. angelicus



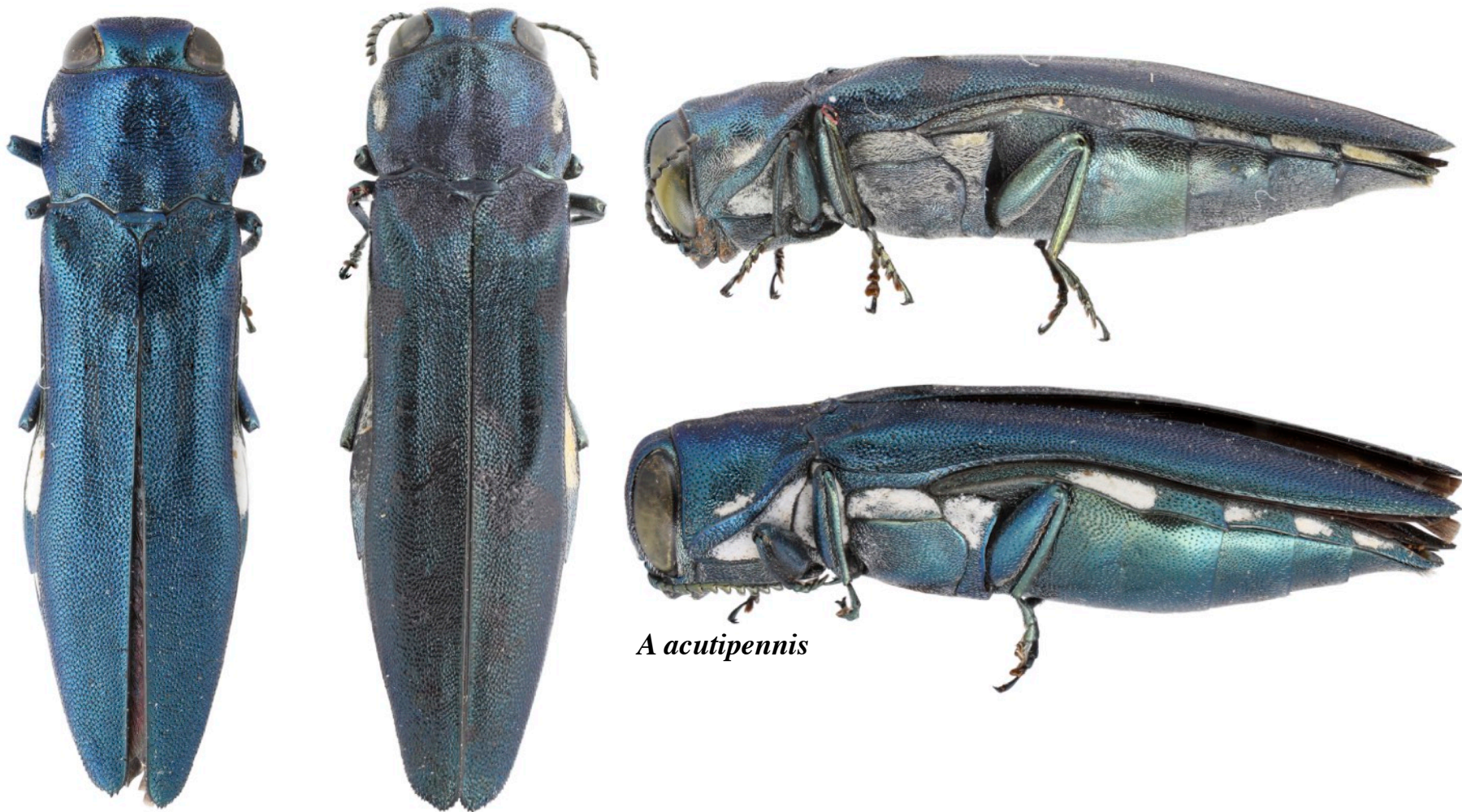
A. politus

4

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



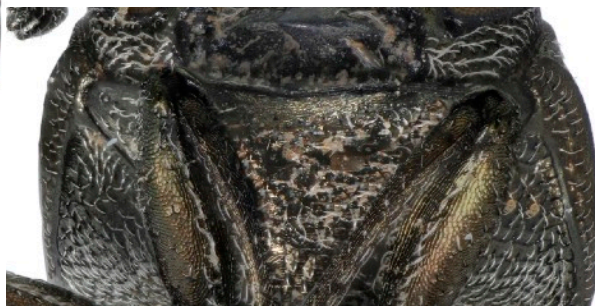
58 (57)

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

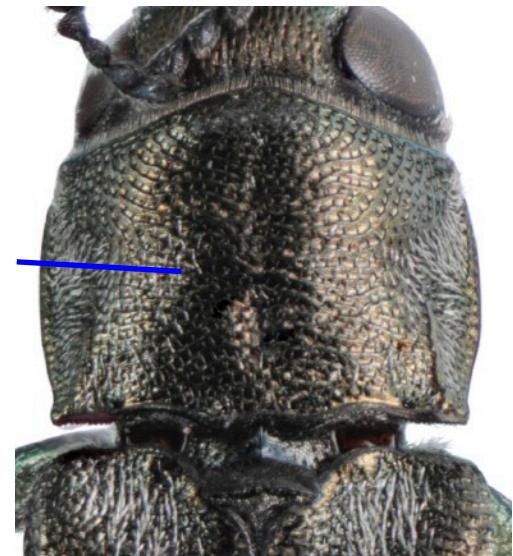
Prosternal lobe emarginate; pronotal impression variable, but when present usually interrupted at middle 59



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

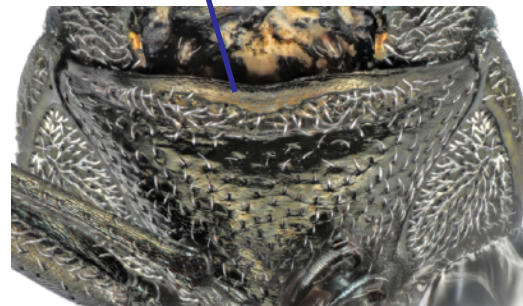


Median impression present
but interrupted at middle



A paracelti

Prosternum
emarginate

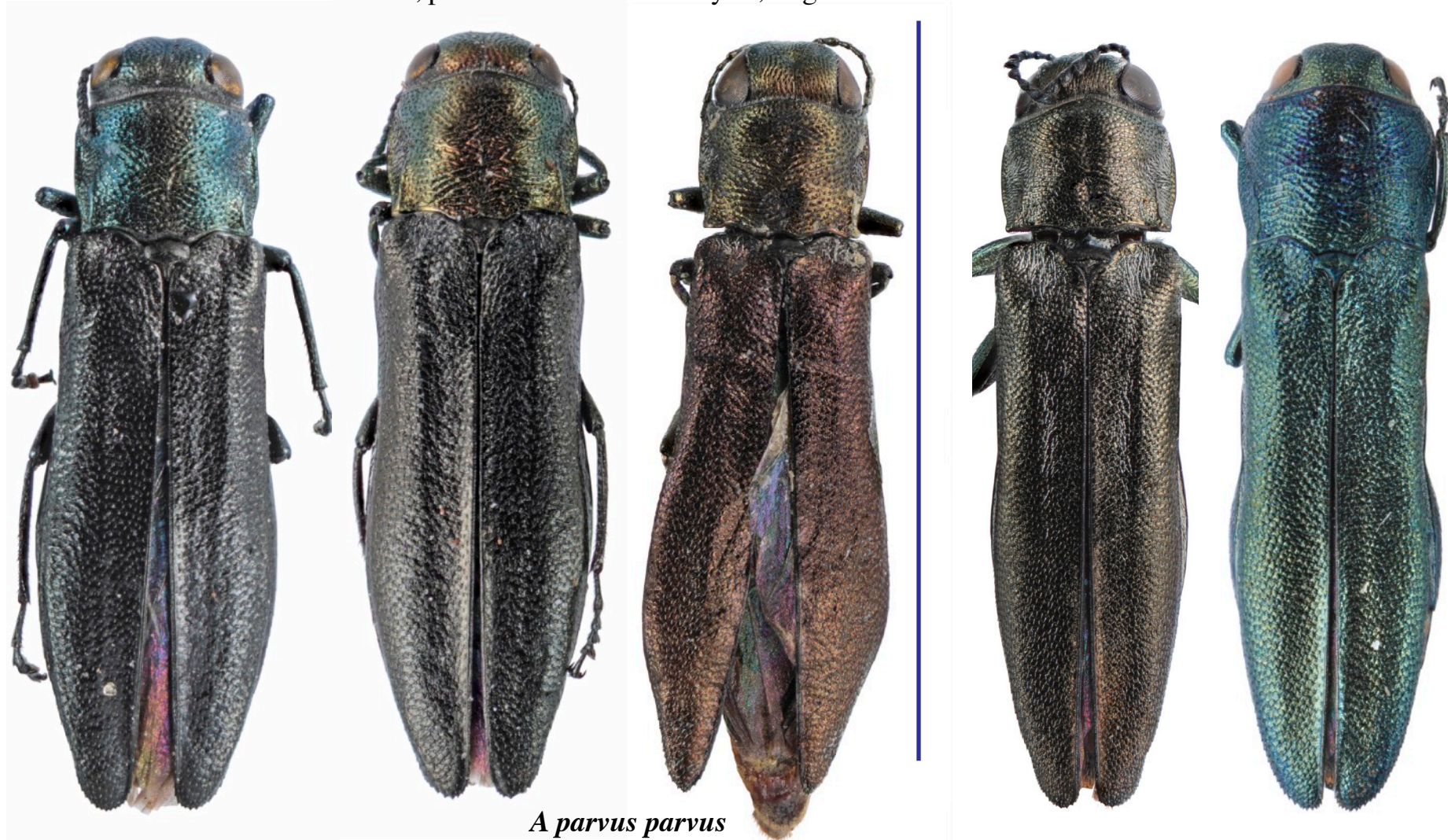


A parvus

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





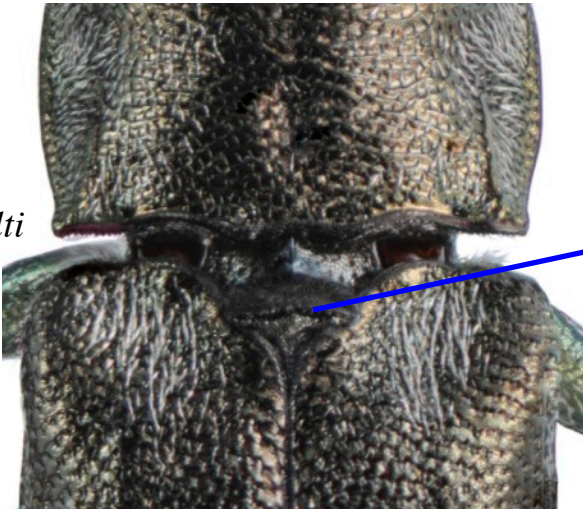
60 (59) part 1 of 2

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 *lacustrus* LeConte

A paracelti

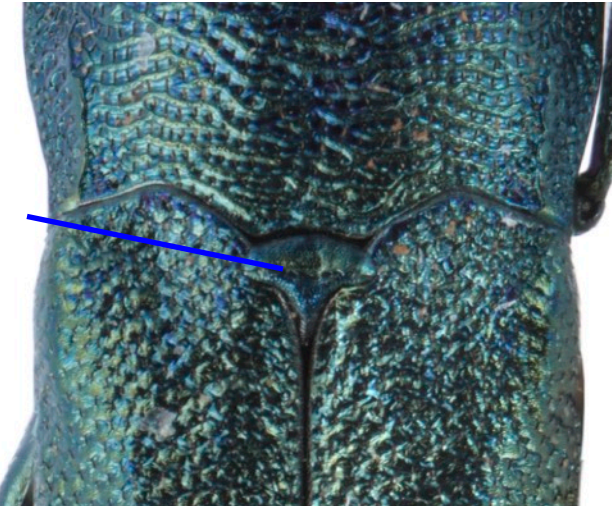


Distinct carina

A egenus



Without distinct carina



A lacustrus



60 (59) part 2 of 2



A paracelti



A lacustris



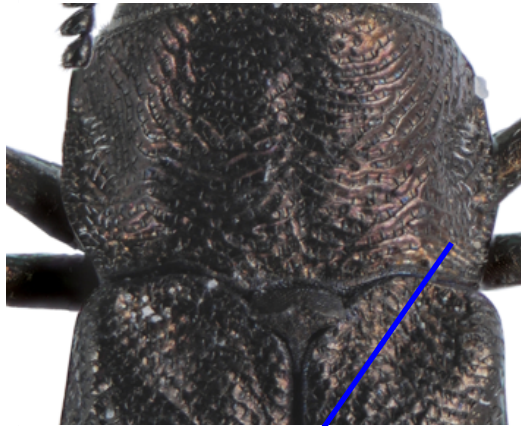


61 (60)



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



Prehumeral
carina absent

A putillus parputillus



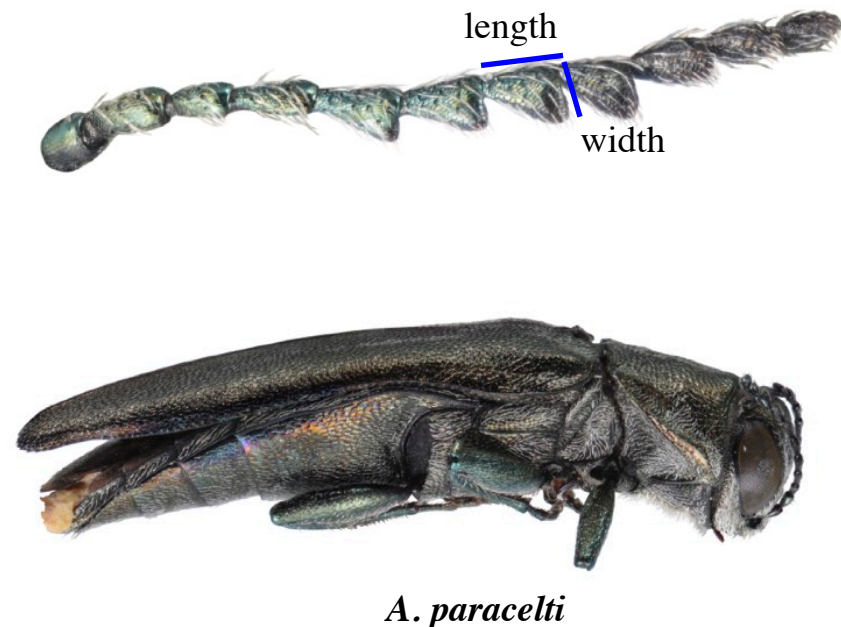
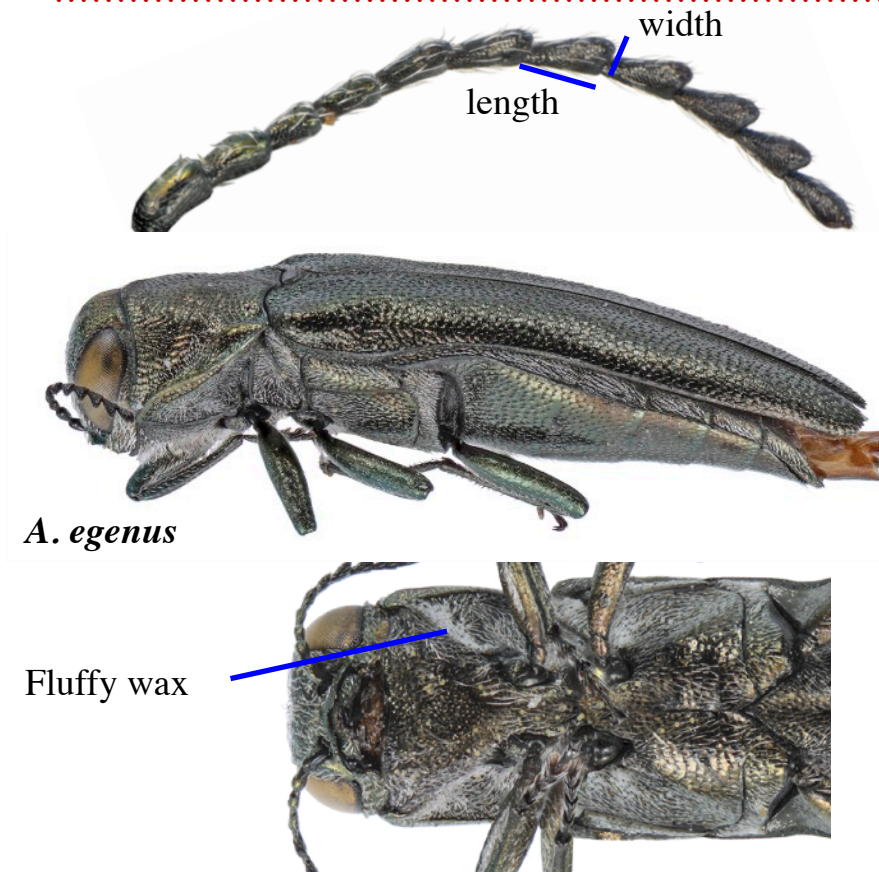
A. egenus



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





62 (61) part 2 of 2



A. egenus



A. egeniformis



A. paracelti



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





64 (63)



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

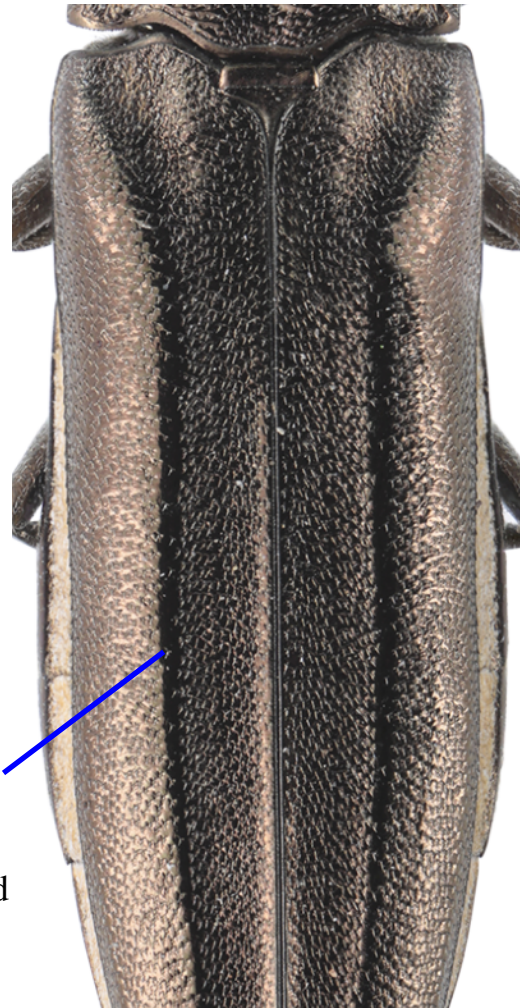
Elytron with strong raised, impunctate costa running down the center; black to greenish bronze; 8.5-14mm; host *Celtis* spp.; FL, LA, and TX. Not native to western US: Report!*macer* LeConte

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

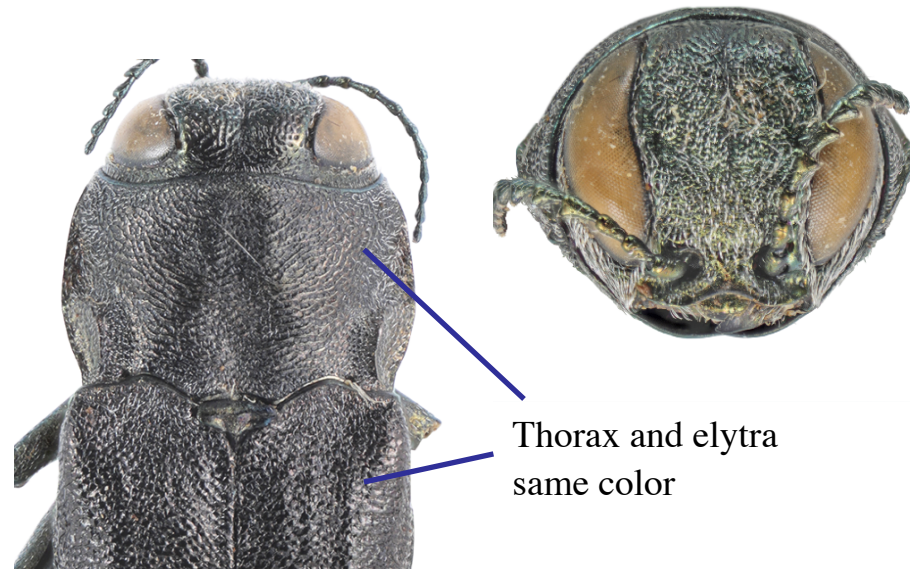
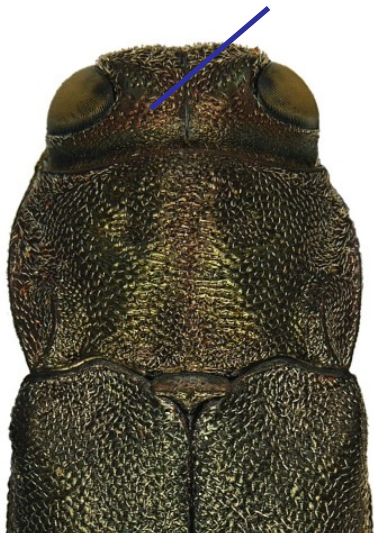
66 (65) part 1 of 2

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. Inner surface of anterior claws parallel or turned medially 68

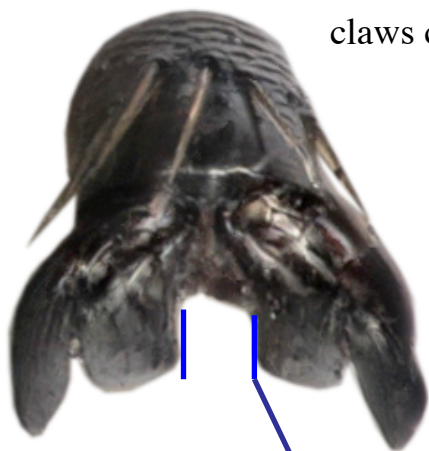
Inner surface of anterior claw turned outward 71



A angelicus

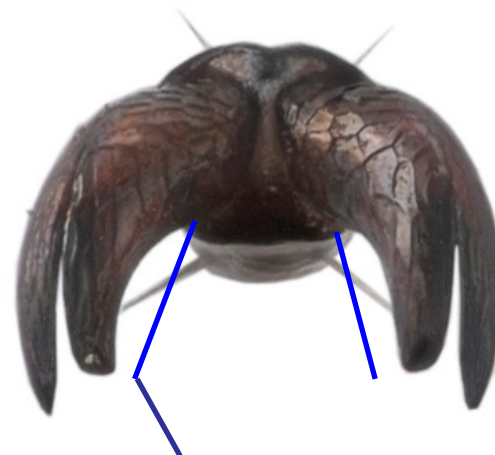


Inner surface of
claws converging



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 *masculinus* Horn

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



Touching or nearly touching



"Beard"



A masculinus



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



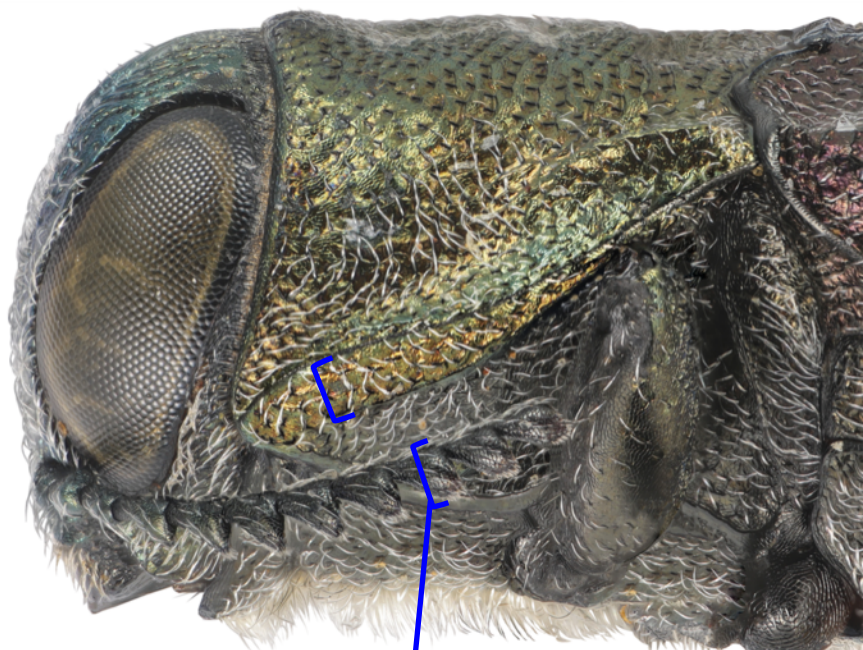
70 (69) part 1 of 3



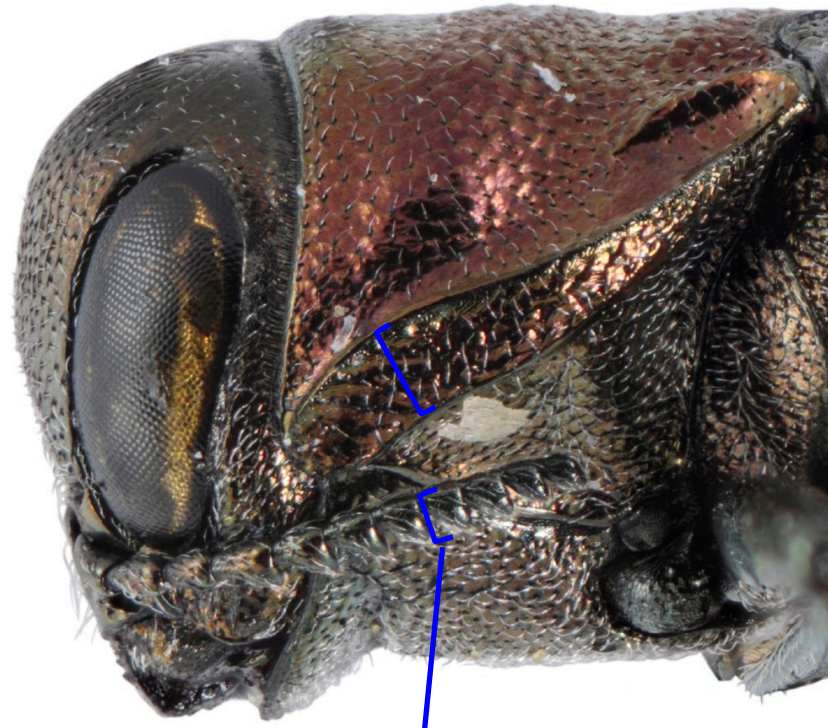
Serrate from 4

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



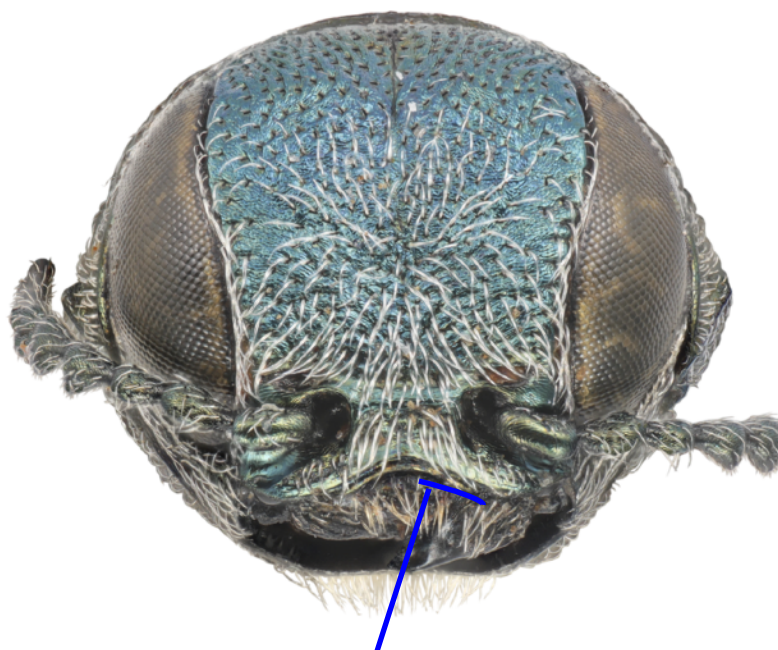
Antenna about as wide as space between lateral carinae



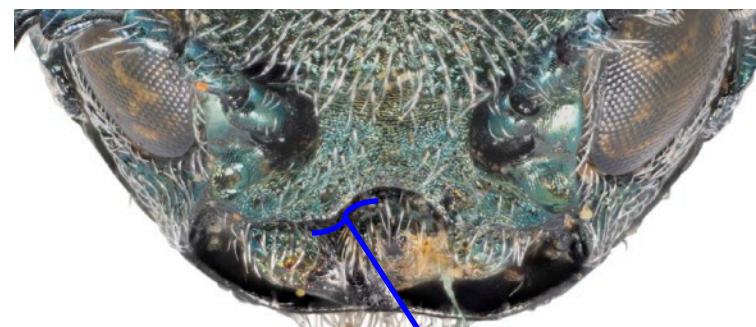
Antenna narrower than space between lateral carinae

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



Serrate from 4

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



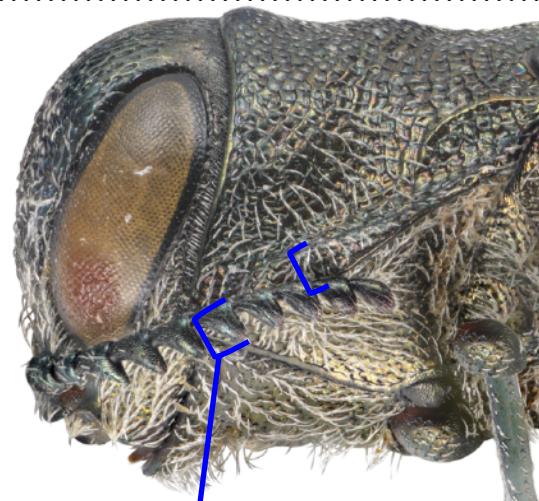
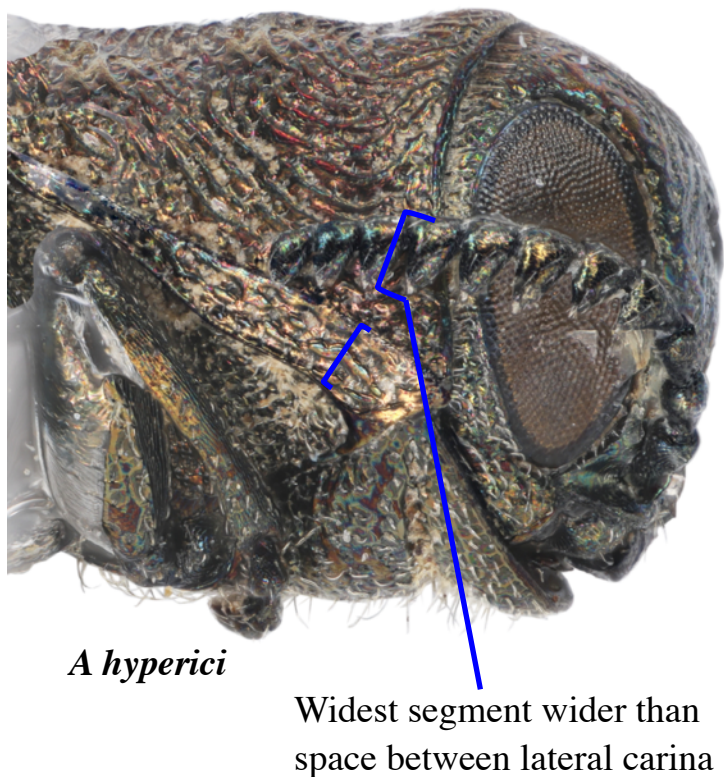


71 (67) part 1 of 2

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





71 (67) part 2 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






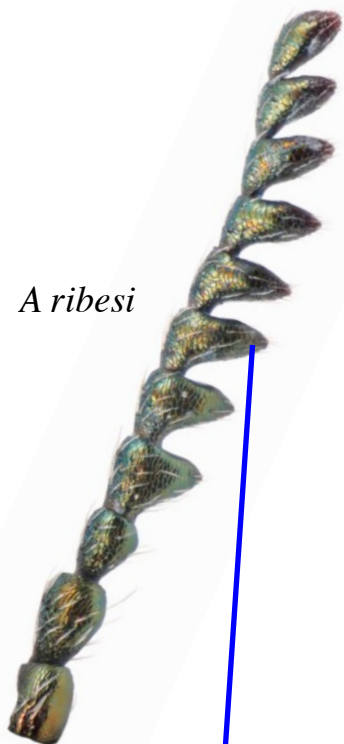
72 (71) 

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



73 (72)

Serrate from 4

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

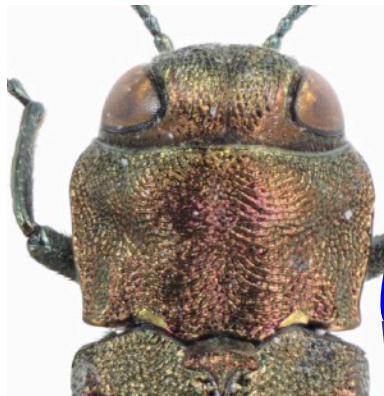
Basal 1/3 sides of pronotum (viewed dorsally) straight, rarely sinuate, pronotum widest at middle (rarely in anterior half); typically olive green metallic; rugae on head straight; 4.8-7.2mm; hosts *Rosa* spp. and *Rubus* spp.; Europe and north Asia introduced to much of N. America including OR and WA, 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



A. cuprescens

Straight



A. ribesi

Curved toward base

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)

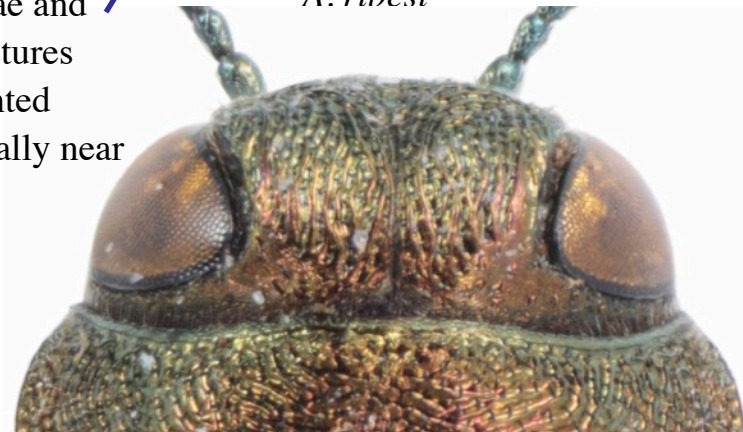
Basal 1/3 sides of pronotum sinuate, pronotum widest in anterior half (rarely at middle); typically bronzy black; rugae on top of head curving laterally; 4.9-7.5mm; *Ribes* spp.; Europe and Asia introduced to MN and Canada (New Brunswick, Ontario, and Quebec). Not native to western US: Report! *ribesi*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

*A. cuprescens*

Rugae and
punctures
oriented to
base of head

*A. ribesi*

Rugae and
punctures
oriented
laterally near
base





A. cuprescens



Typical form



A. ribesi





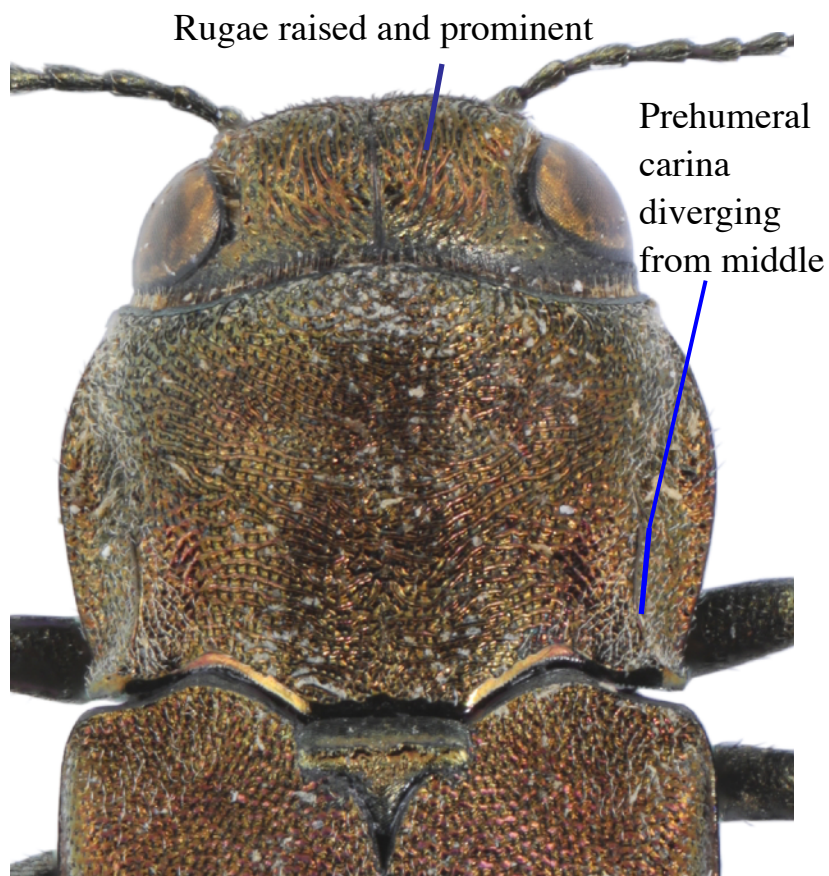
75 (72) part 1 of 2



Serrate from 4

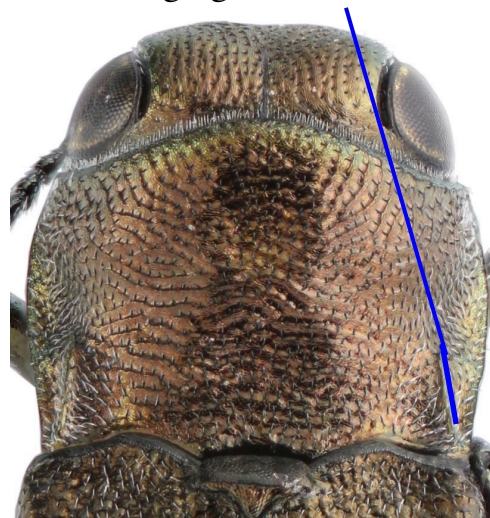
Vertex coarsely sculpted with dense rugae converging dorsally with minimal microsculpture; Larger: 6.1-8.7mm. Prehumeral carinae divergent, viewed dorsally; hosts *Cydonia oblongata*, *Emmenopterys henryi*, *Malus* spp., *Prunus* spp., and *Sorbus* spp. East Asia to Russia. Not native to North America.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

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



A mali

Prehumeral carina parallel to or converging with middle



A cephalicus

Rugae flattened



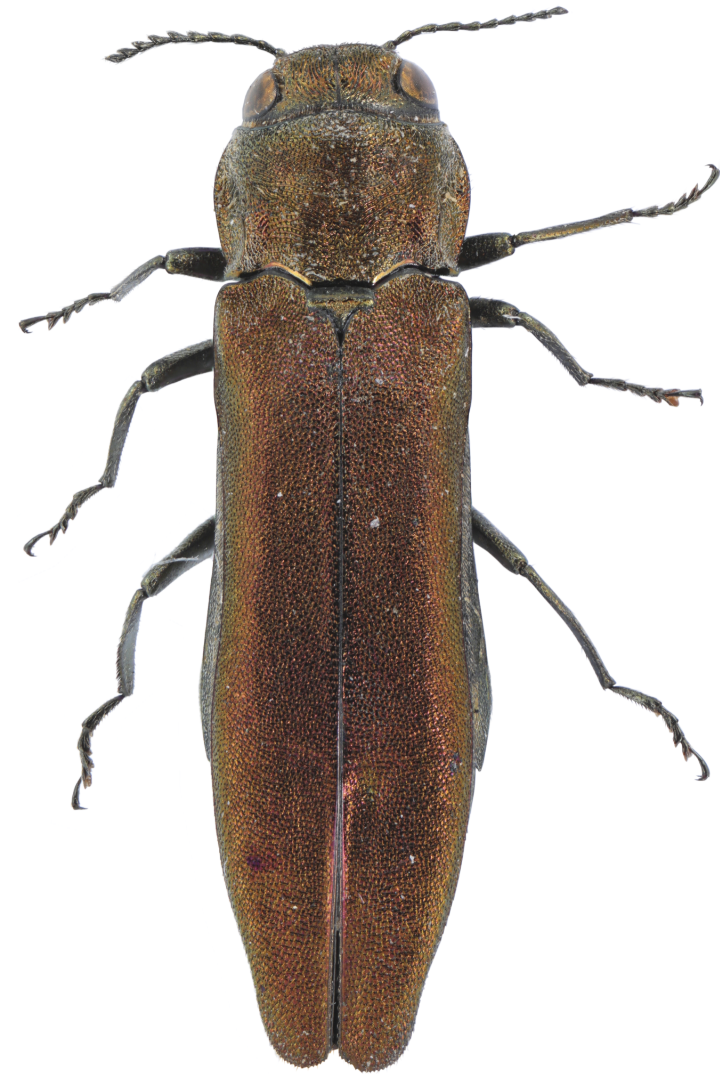
A politus



75 (72) part 2 of 2



Serrate from 4



A. mali female



A mali male



76 (75) part 1 of 2



Serrate from 4

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



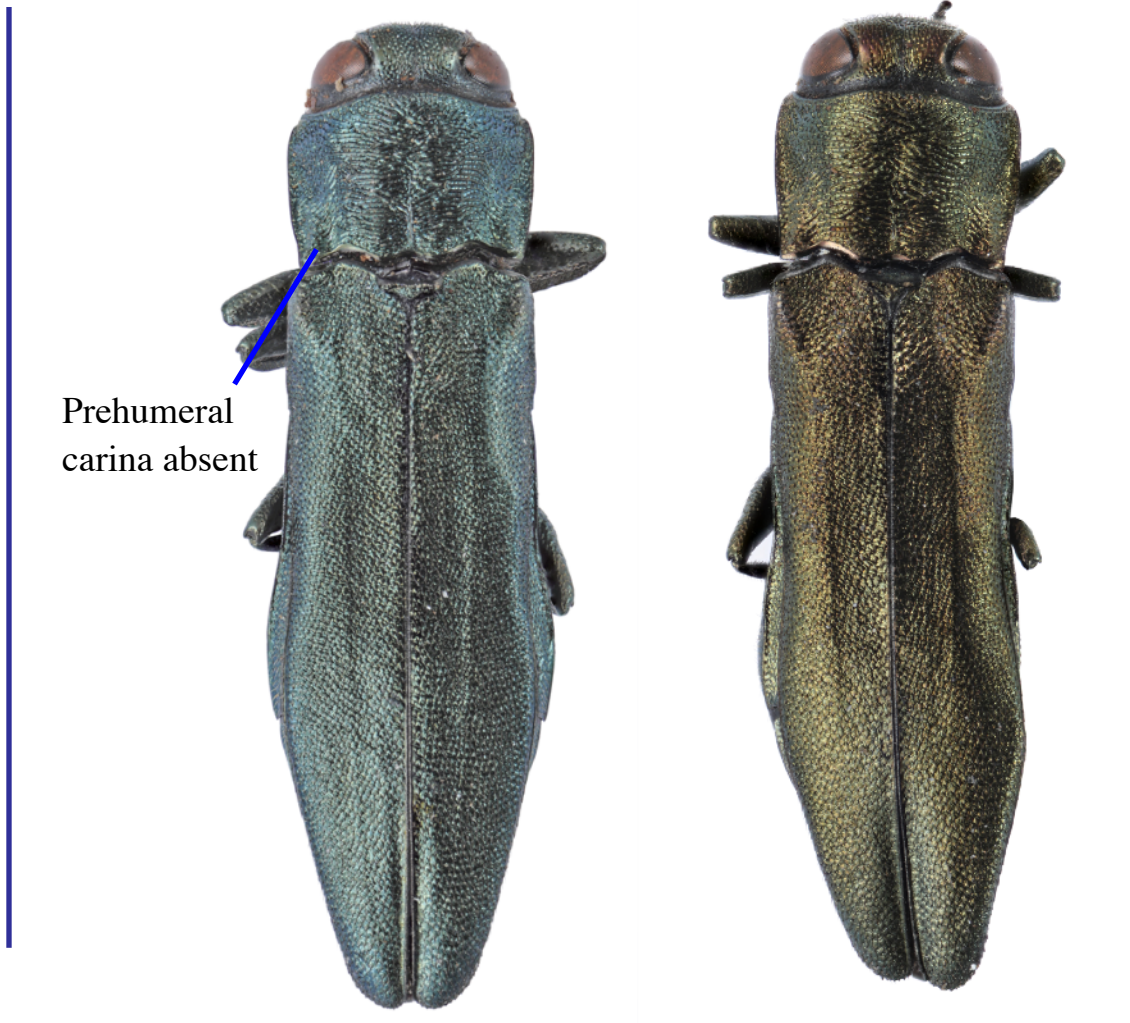
77 (55)



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



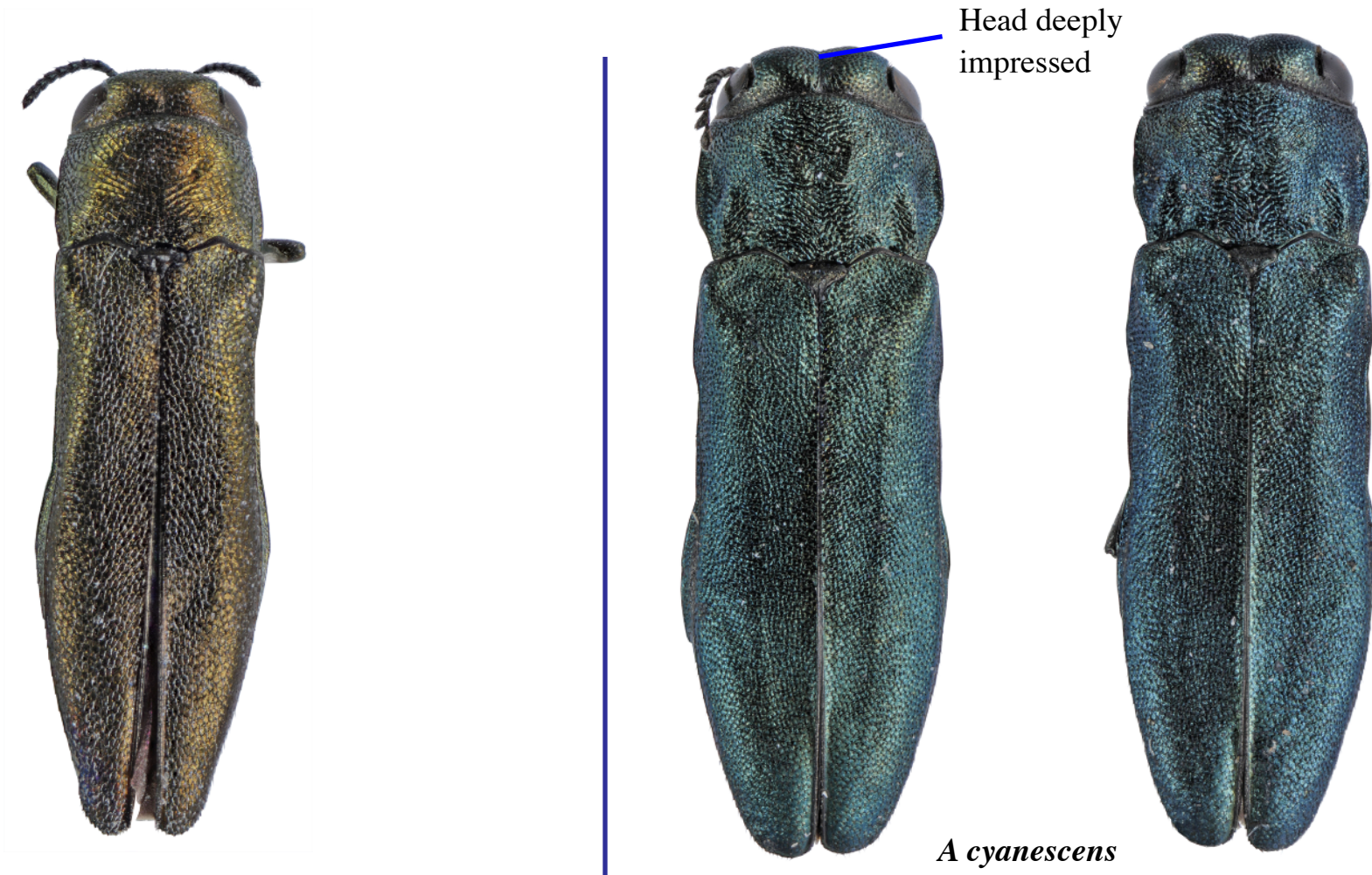


78 (77)

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)





79 (78)

Serrate from 4

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

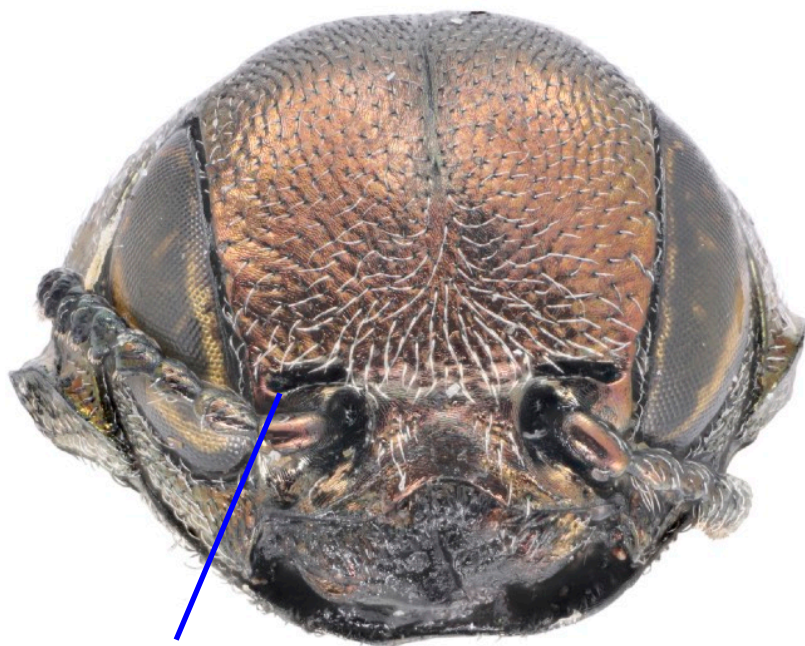


A subrobustus



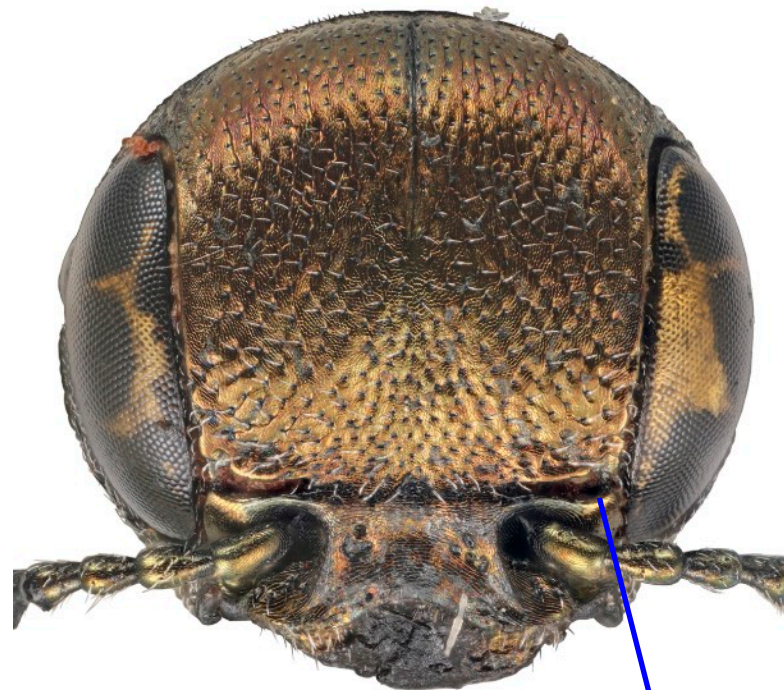
Two forms: blue elytra with a green pronotum or brassy elytra with a reddish pronotum; character to use with caution: pits above antennal bases tend to be similar at both ends, lateral horns of clypeus with upper portion narrower than base or obscure; 4.6-7.3mm; host *Lithocarpus densifolia*; CA and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



Serrate from 4

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

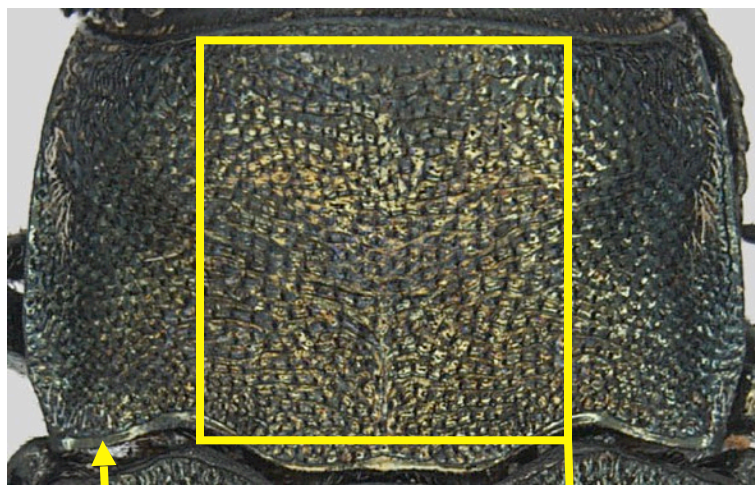




81 (22) part 1 of 2

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



Beginning

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

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