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A New Species of *Xylotrechus* (Coleoptera: Cerambycidae: Clytini) from Utah

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Abstract. *Xylotrechus rameyi*, new species, (Coleoptera: Cerambycidae) is described from southern Utah. Comments on its biology including habitat, host plants and larval history are provided along with photographs of the holotype, allotype**,** the related species *X. insignis* LeConte, and the larval galleries and pupal chamber.

Key Words. Coleoptera; Cerambycidae; Clytini; species biology; host plants; Utah**.**

Introduction

In 2005 several adult Clytini (Coleoptera: Cerambycidae) were collected in southern Utah by Tim Ramey. They were found in their larval galleries in Gambel's oak (*Quercus gambelii* Nutt.). These specimens were compared to known species and determined to be an undescribed species of the genus *Xylotrechus* Chevrolat. Subsequently, the author traveled to southern Utah in July, 2008 to look for additional specimens. While examining a distressed stand of box elder (*Acer negundo* L.) along the east fork of the Virgin River in Kane County, he found they contained numerous Cerambycidae larvae. Several pieces of the infested box elder (12 to 18 inches in diameter) were collected from the trees and placed in confinement chambers to rear the larva through to adults. Between the end of March and mid-June, 2009, 117 adults of the new *Xylotrechus* emerged, not only confirming the new species existence in that area but also another host.

Materials and Methods

Specimens studied are deposited in the following collections:

JCPC – Jim Cope, San Jose, CA, USA (41)
RAPC – Ron Alten, Alta Loma, CA, USA (117 reared out) plus 16 collected
TRPC – Tim Ramey, Fountain Valley, CA, USA (3)
USNM – National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (2)

Specimen images taken at the Smithsonian Institution using a Zeiss AxioCam HRc camera attached to a Zeiss Discovery.V20 stereomicroscope with Sycop motorized zoom and focus control and a PlanApo S 0.63X objective (all equipment and software: Frankfurt, Germany). Image adjustments and plates were prepared using Adobe Photoshop CS6.

Xylotrechus rameyi Alten, new species

(Figures 1–4)

Description. Male (Fig. 1, 3): Robust, cylindrical; integument dark reddish-brown to black; vestiture coarse, appressed, forming pattern of yellow and black integument. Length: 10.5–14.0 mm. **Head**: With frontal carina broad, flattened, more or less V-shaped with margins irregularly defined above; lower face and genae thinly to densely clothed with yellow pubescence; vertex closely, coarsely punctured and rugulose except for well-defined, margined, obovoid , opaque, minutely rugulose impressions on each side of the median line, separated by about the width of the second antennomere. Area between anten-

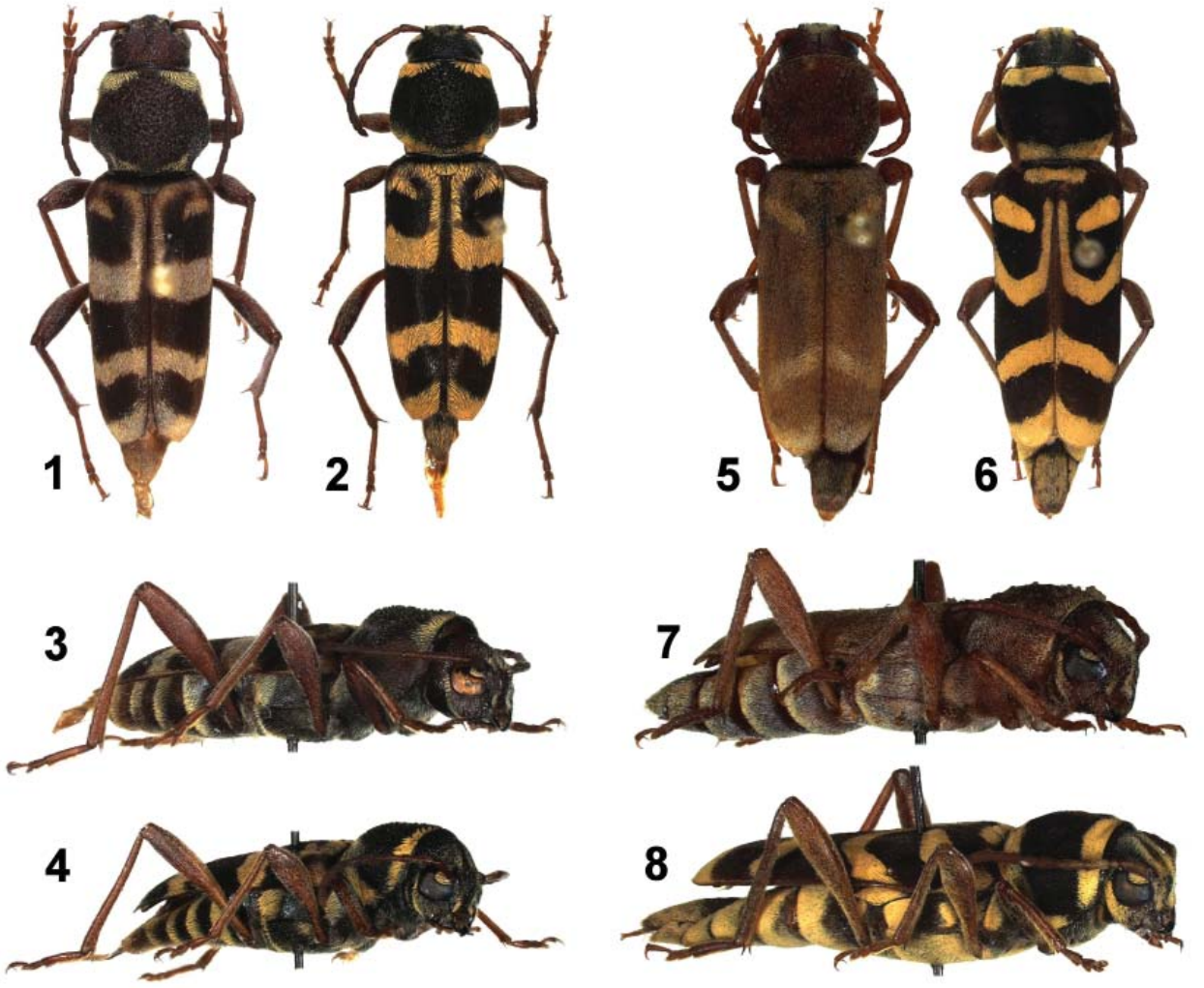
nal insertions and eye densely clothed with appressed yellow pubescence; yellow pubescence on vertex/frons and along lower basal margin of eye moderate to dense, appressed to sub-erect. **Antennae**: 11 segmented, short, robust, barely surpassing elytral humeri; reddish-brown and darker apically; scape with thin, pale hairs on outer surface, mostly recumbent and becoming sub-erect at apex; antennomeres 2–5 or 6 with reddish-brown hairs, mostly coarse, longest at apex; remaining antennomeres with very short, fine brownish pubescence; length of third antennomere sub-equal to, or slightly longer than scape; 4th to 6th antennomeres sub-equal in length and shorter than 3rd; 7th through 10th, sub-equal and shorter than 6th, 11th and sub-equal to 6th. **Pronotum**: Broader than long and widest near the middle of the basal half; slightly narrowed than elytral humeri; sub-angular; surface of disk coarsely, confluently punctured and carinulate; thinly clothed with pale, sub-erect hairs except basal and apical margins are densely clothed with appressed yellow pubescence; marginal pubescent fascia broadest laterally, narrowing medially; apical fascia typically interrupted at midline by a distance about equal to the width of the antennal scape; basal fascia sometimes interrupted medially lateral limits of the disc irregular in shape but with distinctly delimited margins; surface below lateral margins more finely punctate-rugulose, often lighter in color than disk, with shorter, fine pubescence; episternae of mesothorax and metathorax densely yellow pubescent apically; scutellum finely, coarsely punctate, pubescence moderate and present throughout or absent anteriorly. **Elytra**: Sub-parallel sided; length approximately 2.25 times longer than greatest width at humeri; apices obliquely sub-truncate with outer angle minutely acute; covered with short, dense mostly appressed pubescence; sub-basal spot pale yellow or cream pubescent pattern in an oblique, wedge-shaped form; a median fascia curving forward along suture to base and enclosing scutellum; a somewhat oblique transverse band at apical third, and transverse band at the apex. **Legs**: Moderately elongated; femora moderately clavate; rufo-testaceous to fusco-rufous; posterior leg with 1st tarsomere at least twice as long as 2nd and 3rd combined. **Abdomen**: Sternites finely, shallowly, closely punctate; margined with yellow appressed and sub-erect pubescence; decreasing in length from 1st through 5th; fifth sternite with apex shallowly emarginated.

Female (Fig. 2, 4): As in the male except form is somewhat larger on average; vertex of head with a narrow, elevated median line and without obovoid depressions; pronotum less angular, and lacking delimited margins at lateral limits of disc; lateral areas of pronotum below disc textured as disc; elytral fasciae bright yellow as on pronotum; median elytral fascia more expanded along base toward humeri and often weakly connected to sub-basal spot by a few yellow hairs; 5th abdominal sternite longer than 4th and narrowly rounded or sometimes minutely, narrowly emarginated at apex. Length: 11–17 mm.

Type Material. Male holotype, female allotype (USNM): UTAH, Kane Co., Mount Carmel Junction, 1.5 miles south of junction state highways 9 and 89A**,** Elevation, 5,200' (East fork of the Virgin River); G.P.S. North 37.20°; West 112.69°. July 31, 2008. R.L. Alten collector, Larvae collected and reared from Box Elder, *Acer negundo*. R.L. Alten, Collector.

Paratypes: 175: (117) Same data as Holotype (RAPC): (3) Utah, Kane Co., 3.5 miles SE. Jct. Rt. 9 and Rt. 89A. (Mt. Carmel Junction), June 06, 2005. Diapaused adults collected from Gambel's Oak; T.S. Ramey, Collector (TRPC). (10) Utah, Kane Co., 3.5 miles S.E. Jct. Rt. 9 and Rt. 89A (Mt. Carmel Junction). June 06, 2005. Diapaused adults collected from Gambel's Oak. R.L. Alten, Collector, (RAPC). (2) Utah, Piute Co., Sevier, June 10, 2006, collected from Gambel's Oak, J. Cope, Collector (JCPC). (10) Utah, Kane Co., 5 miles S. Mt. Carmel Junction, 20 July, 2007, collected from Gambel's Oak, J. Cope, Collector (JCPC). (5) Utah, Kane Co., 7 miles S. Mt. Carmel Jct., 20 May 2008,Gambels oak, J. Cope, Collector, (JCPC). (15) Utah, Kane Co., 5 mi. S. Mt. Carmel Jct., (ex June 1-29-2010 *Acer negundo*), J. Cope Collector, (JCPC). (9) Utah, Kane Co., 3 mi. S. Mt. Carmel Jct., 12 July, 2011. J. Cope, Collector. Collected from Gambel's Oak, (JCPC). (4) Utah, Kane Co., Rt.89A, 3 miles SE Jct. Rt. 9 Rt. and Rt. 89A, (Mt. Carmel Junction), at Coral Pink Sand Dunes Rd. August 01-07, 2011, collected from Gambel's Oak as larvae and reared by R. L. Alten, (RAPC).

Biology. Larval development occurs within the transitional area between living and dead wood. Field observations indicate that infestations can occur in box elder (*Acer negundo*, Fig. 9–11) and Gambel's oak trees (*Quercus gambelii*, Fig. 12–14). Box elder infestations can be light to severe, so that in some trees, the wood is riddled with hundreds of active galleries, containing a high population density of larvae. This situation has only been observed to occur in box elder trunks, with mature tree trunks on



Figures 1–8. Two species of *Xylotrechus*. **1–4)** *Xylotrechus rameyi* habitus images, dorsal and lateral views. **1, 3)** Male. **2, 4)** Female. **5–8)** *Xylotrechus insignis* habitus images, dorsal and lateral views. **5, 7)** Male. **6, 8)** Female.

average 12 to 20 inches, and up to 40 inches in diameter, providing a resource sufficient to support large population densities. Because the average Gambel's oak trunk diameter is only 4 to 6 inches, infestations are comparatively light and scattered within the tree. This explains why the population densities found in oak are relatively low compared to those occurring in box elder. In both host species, the beetles respond in the same manner requiring the same microhabitat for oviposition and larval development.

Dispersal of *Xylotrechus rameyi* is typical for a species of this genus, with adults usually emerging between May and July. The species may be capable of completing its life cycle in one year, although the life cycle can vary between one to several years before emergence occurs, depending upon annual environmental factors of overall ambient temperature and moisture.

Field observations of *X. rameyi* indicate that the earliest adult emergence appears to occur on the south-western face of the tree trunks (*Acer negundo*, Fig. 9–11) caused by the general overall warming effect of solar exposure that produces conditions for accelerated development.

Gravid females appear to be attracted to the cured host wood adjacent to living tissue that is in a distressed condition. In the author's opinion, based upon a number of field observations, the female is attracted to distressed trees by olfaction, probably being attracted to the collective odor being released from both dead and living wood. Therefore, it is the condition of the trees, rather than the tree species itself that is the predominant factor in determining the stimulus for oviposition and where on the host.

Figures 9–11. Box elder (*Acer negundo*) containing *X. rameyi.*

Jim Cope (pers. comm.) observed a female ascending a box elder tree trunk, ovipositing eggs singularly as she moved upward. Larvae have been collected along the entire length of the tree trunk [within this type of microhabitat].

The diapaused adult waits within the pupation cell for warm humid conditions to occur, stimulating emergence. Cold and adverse environmental conditions along with latitude and relatively high elevation often can delay emergence and dispersal well into late spring to mid-summer or even later. During wet and cool years, adult emergence is delayed considerably and during some years completely, as was observed in 2011, when diapaused adults were removed from pupal chambers in *Quercus gambelii* (Fig. 12–14) the first week in August. During dry years, the reverse can occur, in that emergence can occur earlier, driven by the lack of moisture and higher diurnal ambient temperatures from clear warm days.

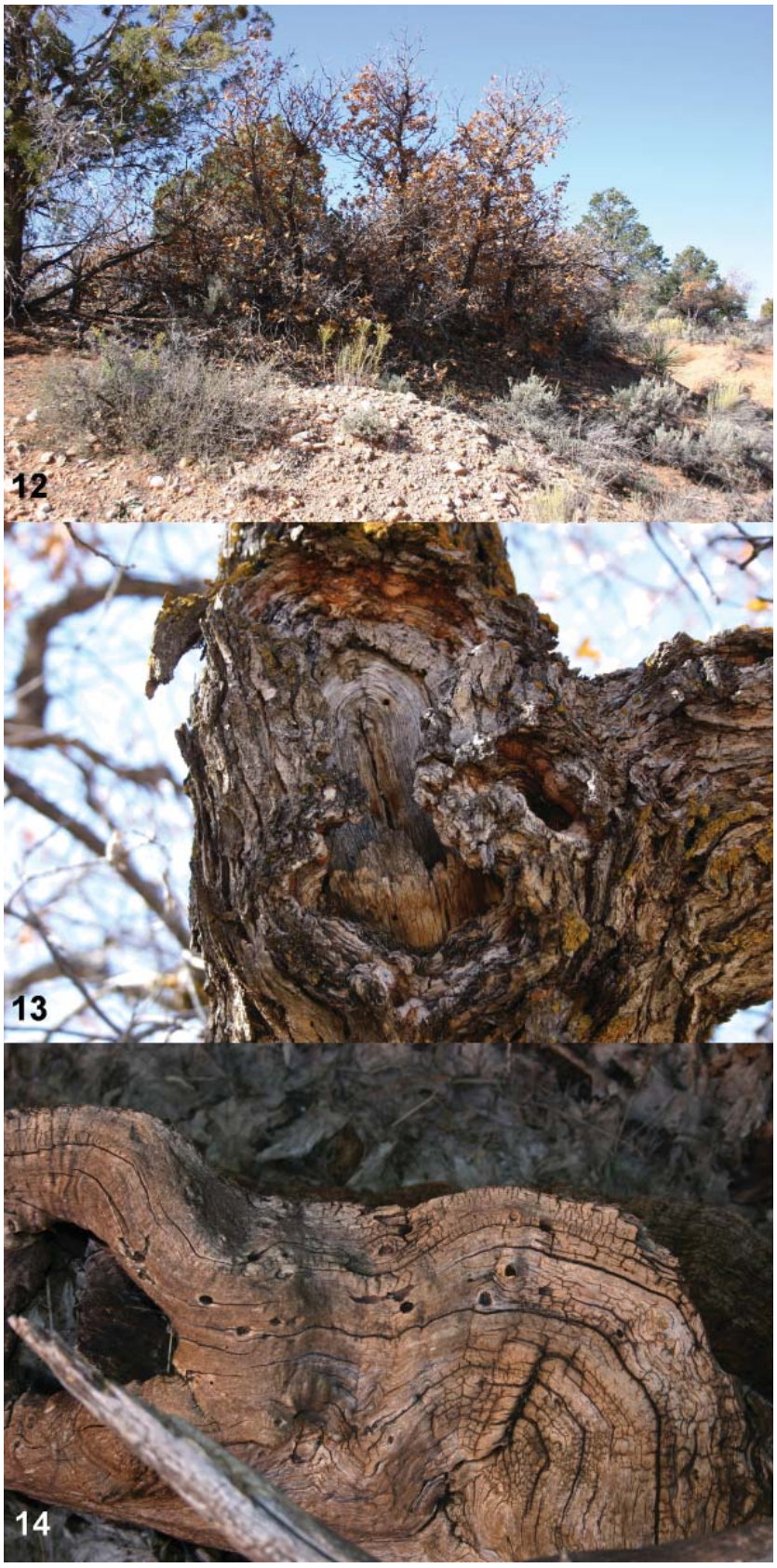
Modification of Linsley's (1964) key to *Xylotrechus* species to include couplets for *X. rameyi*

Both sexes of *Xylotrechus rameyi* will key to *X. insignis* (female) in Linsley's 1964 key to *Xylotrechus* (pages 104–107) and appear most closely related to it. The following modifications to Linsley's key will separate *Xylotrechus rameyi* from *X. insignis* and both sexes of *X. obliteratus* LeConte (1873).

13(12) Pronotum distinctly margined at base and apex with a band of yellow pubescence. **14**
– Pronotum not margined at base and apex with a band of yellow pubescence..... **15**

14(13) Elytra with postmedian pubescent band evenly arcuate to suture, all markings bold, bright yellow..... **26**
– Elytra with postmedian pubescent band anteriorly angulate before suture, direct back towards suture, markings narrow, pale yellow. Length 15 mm. Colorado. ....***X. obliteratus*** **LeConte** (female)

15(13) Elytra with white pubescent bands made indistinct by a suffusion of white pubescence over entire surface, band present at median basal margin and along apices. Length 15–16 mm. Colorado.....***X. obliteratus*** **LeConte** (male)
– Elytra with yellow pubescent bands contrasting brightly with black integument, bands not present at basal or apical margins. Length, 16mm. Oregon. ....***X. nunenmacheri*** **Van Dyke** (female)



Figures 12–14. Gambel's oak (*Quercus gambelii)* containing *X. rameyi*.

26(14) Elytra with premedian pubescent band not thickened along transverse angle, and not reaching scutellum along suture (Fig. 6,8). Humeri devoid of pubescent pattern. Length 14–20 mm. Oregon to northern Baja California..... ***X. insignis* LeConte** (female)

– Elytra with premedian pubescent band thickened on transverse angle, narrowing along suture and reaching scutellum, expanded along elytral base to humeral margins, with oblique spots distinctly to feebly connected. Males 11–14 mm, bands whitish-yellow to cream color (Fig 1,3); Females 11–17mm, bands yellow color (Fig. 2,4). Southern Utah and northern Arizona. .... ***X. rameyi*, n. sp.**

While both sexes of *X. rameyi* superficially resemble the female of *X. insignis*, the two species differ in the following characters, compare Figures 1–8.

1. The integument of both sexes of *Xylotrechus rameyi* appears to be identical.
2. The pubescence of *X. rameyi* is less than *X. insignis* on the mesosternum.
3. Dorsally, both sexes of *X. rameyi* have the pubescent basal band covering the entire elytral humeri including the scutellum and the oblique post basal band.
4. In *X. insignis* females, the post basal band stands out distinctly and is separated by the black elytral integument.
5. The yellow premedian pubescent band is transverse from the left and right margins, as it connects to the suture and covers the scutellum.
6. The yellow pubescence of *X. rameyi* in both the pronotum and elytra appear to have a long furry appearance, while in *X. insignis* the yellow pubescence appears bold and painted.

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