

# A REVIEW OF THE GENUS PHANAEUS INHABITING THE UNITED STATES

(SCARABAEIDAE: COLEOPTERA)

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The specimens used as the basis for this paper were about two hundred and fifty in number and are located in the collection of the Academy of Natural Sciences, Philadelphia or in the collection of the author, with the exception of a pair of *Phanaeus torrens niger* from the collection of O. L. Cartwright.

The last time the United States species of this genus were treated in a paper was by F. Blanchard,<sup>1</sup> with the exception of the fine monograph of the entire genus by d'Olsoufieff.<sup>2</sup> The present paper reduces two known forms to subspecific rank, two new subspecies are created and one species is added to the United States List.

## *Key to the Species and Subspecies*

- Clypeus at most feebly emarginate in front.....1  
Clypeus deeply emarginate, with a tooth on either side of the emargination; black, semiopaque.....**pluto**
1. Elytral striae barely indicated.....2  
Elytral striae deep or at least entirely visible without magnification.....3
2. Opaque; black with a greenish or bronze tint.....**triangularis**  
Shining; bright blue or green.....**quadridens**
3. Elytral intervals coarsely, deeply and more or less confluent punctured.....4  
Elytral intervals shallowly punctured, few of the punctures are confluent.....9

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<sup>1</sup> 1885. F. Blanchard, Trans. Amer. Ent. Soc., XII, p. 168.

<sup>2</sup> 1924. G. d'Olsoufieff, Insecta Rennes, 13.



4. Intervals 1, 2, 3 and 4 costate.....6  
 Intervals 1, costate, 2, 3 and 4 not costate.....7
6. Disk of thorax cupreous, elytra dark green.....**vindex vindex**  
 Thorax bluish-green, elytra bluish-black.....**vindex cyanellus**
7. Hind angles of male thorax flared inwards; side margins in front  
 irregularly serrate.....8  
 Hind angles of male thorax flared outwards, side margins in front  
 entire.....**vindex rubervirens**
8. Found in Texas to Kansas.....**difformis difformis**  
 Found in Florida.....**difformis magnificens**
9. Elytral intervals with large, shallow punctures.....11  
 Elytral intervals with fine, sharp punctures or obsolete punctured  
 .....10
10. ♂; thoracic discoidal elevation has the dentiform hind angles well  
 separated; in front of these angles are a pair of tubercles, some-  
 times being connected by a transverse carina; between these  
 tubercles and the anterior margin is another smaller tubercle.  
 ♀; horn on head short bituberculate; posterior pronotal margin  
 without foveae.....**mexicanus**  
 ♂; thoracic discoidal elevation has the cariniform hind angles more  
 approximate; just behind the anterior margin are three well spaced  
 tubercles.  
 ♀; horn on head short trituberculate; posterior pronotal margin with  
 a large punctiform impression on either side of the median line.  
**amithaon**
11. Color green or blue, the pronotum sometimes with a cupreous  
 tint.....12  
 Color coppery or black.....13
12. Elytral intervals coarsely, sometimes confluent punctured, the  
 bottoms of the punctures granulose.....**igneus igneus**  
 Elytral intervals coarsely punctured only near the margins, finely  
 and sparsely punctured medially.....**igneus floridanus**
13. Color coppery.....**torrens torrens**  
 Color black.....**torrens niger**

**Phanaeus pluto** Harold

1863. *Phanaeus pluto* Harold, Ann. Soc. Ent., Fr., p. 164.

This large black species has the head armed with a trituberculate carina in both sexes. The male has the projecting thoracic prominence quadrituberculate on the front edge while the female has a short, transverse, rounded ridge just back of the anterior edge of the pronotum; this ridge is followed by a slight depression.

Outside of Mexico this species has only been recorded from Arizona.



**Phanaeus quadridens** Say

1837. *Copris quadridens* Say, Bost. Journ. Nat. Hist., 1, p. 176.

The well-developed male of this species is armed with a long, curved, acute horn on the head. The disk of the pronotum is triangularly shaped with the posterior angles produced into flattened, subacute projections; inside of each of these projections is a short, acute, conical tubercle. The anterior edge of the pronotal disk has a pair of sharp tubercles connected with a raised carina. The female has a short trituberculate horn on the head with a raised transverse line on the anterior part of the pronotum.

Like the preceding species this species has only been recorded from Arizona, outside of the Mexican localities.

**Phanaeus vindex vindex** MacLeay

1819. *Phanaeus vindex* MacLeay, Hor. Ent., 1, p. 133.

This well-known species needs but little description. The fully developed male is armed somewhat like the preceding species except the four tubercles on the thoracic disk are missing; the posterior part of the thoracic disk has a raised, curved line connecting the inner side of the posterior projections. The female is armed as the preceding species except the frontal horn is rarely tuberculate.

This form is found all over eastern United States with the exception of the extreme northern sections.

**Phanaeus vindex cyanellus** Robinson

1938. *Phanaeus vindex cyanellus* Robinson, Trans. Amer. Ent. Soc., LXIV, p. 107.

This subspecies is found only in Florida.

**Phanaeus vindex rubervirens** new subspecies

In both sexes the elytral intervals are not costate as they are in the typical form; the basal half of the first interval has a wide flat costa in *rubervirens* while *vindex* has the first four intervals fully costate. In addition the color of the elytra is a yellowish green while *vindex* has the elytra a darker or bluish green. The elytral punctures in *rubervirens* are round, while they tend to be elongated in *vindex*.

The male genitalia of *rubervirens* differs from the typical form by having a wide deep groove parallel to and near the inside of each clasper, running back from the apex.

Length, 18 to 21 mm.; breadth, 10.5 to 12 mm.

*Type*.—♂; Chiricahua Mountains, Cochise County, Arizona, June 23, 1908. In the collection of the Academy of Natural Sciences, Philadelphia.



*Allotype*.—♀; Chiricahua Mountains, Cochise County, Arizona, August 6, 1908.

*Paratypes*.—3 ♂; with the same data as the allotype, 1 ♂; Carr Canyon, Huachuca Mountains, Cochise County, Arizona, 1 ♂; Palmerlee, Arizona, July 17 (H. A. Kaeber). 7 ♂, 10 ♀; Fort Huachuca, Arizona. 1 ♀; Estacion Conchos, Chihuahua, Mexico. Paratypes are deposited in the collection of the Academy of Natural Sciences and in the collection of the author.

### **Phanaeus difformis difformis** Leconte

1847. *Phanaeus difformis* Leconte, Journ. Acad. Nat. Sci. Phila., (II), v. 1, p. 86.

The remarks under the subspecies *magnificens* plus the key should be sufficient to separate this fine species. The color varies from entirely green to specimens with the thorax green and the elytra blue to specimens with the disk of the thorax cupreous and the rest of the dorsal side green.

The range of this form extends from Kansas to Texas and New Mexico.

### **Phanaeus difformis magnificens** new subspecies

This colorful insect can be distinguished from the typical form in the well-developed male specimen by the flat discal area on the pronotum being smaller and more confined, and the posterior ridge on this area is curved to meet the posterior angles while in *difformis* this ridge is more or less straight. The sculpturing of this discal area is sharper with evidently more space between the raised areas in *magnificens*. The situation before the hind angle appears to be more nearly at right angles in the new subspecies than in *difformis* in both sexes.

The major difference in the females of these two forms is in the transverse ridge on the pronotum which in *difformis* is curved while it is straight in the new form. The pronotal sculpturing on the disk is sharper and a little more widely separated in this sex, the same as in the male.

The male genitalia of *magnificens* have the claspers straight in outline when viewed dorsally while *difformis* has these claspers turned inwards at the tip when viewed in the same direction.

The color of the head and pronotum is green with purplish reflections, the flat area on the pronotum of the male is cupreous while the male horn is black. The elytra of both sexes are purplish with the sutural area of the male green.

Length, 20 mm.; breadth, 11.5 mm.

*Type*.—♂; Romeo, Marion County, Florida, April 15, 1947, (M. Robinson). In the collection of the author.



*Allotype*.—♀; with the same data as the type. In the collection of the author.

**Phanaeus triangularis** Say

1823. *Phanaeus triangularis* Say, Journ. Acad. Nat. Sci. Phila., (I), v. III, p. 206.

The head and thorax of this opaque species is of the same general shape as *vindex* in both sexes but the sculpturing of the surface is finer. The elytral surface is granulose with irregular, wavy, raised areas; the striae are barely indicated.

Described from Arkansas but also has been collected in Missouri, Texas and South Carolina.

**Phanaeus torrens torrens** Leconte

1847. *Phanaeus torrens* Leconte, Journ. Acad. Nat. Sci. Phila., (II), I, p. 85.

1854. *Phanaeus triangularis torrens* Leconte, Proc. Acad. Nat. Sci. Phila., VII, p. 217.

This form was reduced to varietal rank by Leconte in 1854, when he wrote, "by the completion of the series of specimens, proves to be a bright colored, short horned variety of *P. triangularis*."

This author has never seen specimens intermediate between *torrens* and *triangularis*; all specimens examined have been easily placed with one or the other species and for this reason he has placed *torrens* as a distinct species.

*Phanaeus torrens* is shining, not opaque; the elytral striae strongly impressed and the intervals convex, not flat as they are in *triangularis*. In addition the male genitalia are shorter and not granulate at the tips of the claspers as in *triangularis*. I have not seen any male specimens with a long horn on the head, all seen, including the type, having a short, acute horn.

Specimens have been examined that were collected in Kentucky and Kansas.

**Phanaeus torrens niger** d'Olsoufieff

1924. *Phanaeus niger* d'Olsoufieff, Insecta Rennes, 13, p. 95.

This form was described from specimens collected in Louisiana and specimens have been examined from that state, Mississippi



and Mexico, agreeing very well with the written description. An examination of the male genitalia of these specimens shows a marked variance from the illustration in d'Olsoufieff's paper; the tips of the claspers are not raised into short knobs as illustrated in his paper. This leads me to conclude that the illustration is in error as the written description fits the insect in all characters.

This insect agrees with typical *torrens* in all respects except color, being black as the name implies, while *torrens* is coppery; the male genitalia of the two species seem to be identical.

**Phanaeus igneus igneus** MacLeay

1819. *Phanaeus igneus* MacLeay, Hor. Ent., I, p. 133.

This form has been collected from North Carolina to northern Florida.

**Phanaeus igneus floridanus** d'Olsoufieff

1924. *Phanaeus floridanus* d'Olsoufieff, Insecta Rennes, 13, p. 94.

This subspecies was described as a full species but an examination of a large series of specimens reveals it to be a southern form of *igneus*, it being found only in Florida. This subspecies differs from the typical form in being more shining, and in having the elytral intervals with the surface less densely punctured. All forms of intergradation occur in northern Florida. The male genitalia of most of the specimens examined seem to be intermediate between the illustrations in d'Olsoufieff's paper for *igneus* and *floridanus*.

**Phanaeus mexicanus** Harold

1863. *Phanaeus mexicanus* Harold, Ann. Soc. Ent. Fr. (4), III, p. 171.

The information given in the key should be sufficient to distinguish this species from the following species and any others known to occur in the United States. Has been collected in Arizona.

**Phanaeus amithaon** Harold

1875. *Phanaeus amithaon* Harold, Col. Hefte, XIII, p. 88.

This species is added to the United States lists on the strength of four specimens collected at Phoenix, Arizona on the 10th of

August, 1908. These specimens are located in the collections of the author and the Academy of Natural Sciences of Philadelphia.

The types of this species were collected at Guanajuato, Mexico, but I have seen samples from Nayarit and Sinaloa. This indicates that the species occurs from the type locality westward to the west coast of Mexico then northward to Arizona.