

The Scarabaeinae of Oklahoma (Scarabaeidae, Coleoptera)

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INTRODUCTION

Approximately 74 species of beetles belonging to the subfamily Scarabaeinae occur in the United States. This work covers only those species recorded or expected in Oklahoma. This includes seven genera containing 31 species of which 28 are known and three are likely to occur in the state. The synonymy in general is from Leng (1920, 1927, 1933), Blackwelder (1939), Blackwelder and Blackwelder (1948). The distribution data are county records obtained for the most part from the Entomology Museum of the Department of Entomology, Oklahoma State University and from literature, Blackwelder (1939), Blackwelder and Blackwelder (1948), Blanchard (1885), and Leng (1920, 1927, 1933). Also used were Brown (1927, 1929, 1946), Robinson (1947, 1948a, 1948b), Schaeffer (1906, 1914), and Howden and Cartwright (1963). The distribution of specimens in the Stovall Museum, University of Oklahoma (O.U.) is listed only when they represent additional data.

Arnett's work (1960) has been of particular help in separating the different genera.

The beetles belonging to the subfamily Scarabaeinae are generally coprophagous, but all species are scavengers. Besides feeding in manure, some species are frequently found in decaying plant materials and at dried carrion. *Onthophagus*, the genus containing the largest number of species, constructs a vertical well in the soil beneath the food material, some of which is carried into the burrow where the beetle either feeds or lays an egg upon it. *Canthon*, the genus to which the common and well known "tumble bugs" belong, have the unique habit of segregating a ball of dung and rolling it around until they find a suitable place to dig a hole and bury it. The eggs are laid in a small opening in the ball, and after hatching, the larvae feed upon the ball until pupation.

Sexual dimorphism is well developed in some of the genera. This is usually found in the protuberance, sculpture and form of the head and thorax. In genera in which these characters are of value in separating the species, the sexual characters are described in the description of the species.

The subfamily Scarabaeinae, as used in this paper, may be separated from other subfamilies by the following characteristics: at least the last two segments of the antennal club gray-tomentose; metatibiae with just one apical spur; pygidium exposed (Dillon and Dillon, 1961).

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SYSTEMATICS

Key to the Scarabaeinae of Oklahoma

1. Middle and posterior tibiae slender, curved, scarcely enlarged at the extremity; head and thorax always unarmed 11
- Middle and posterior tibiae dilated at the extremity; usually one or both sexes with head or thorax armed 12

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| 2. Anterior tarsi absent; elytral epipleural fold broad | |
| Anterior tarsi short but present; elytral epipleural fold narrow or absent | <i>Deltochilum gibbosum</i> |
| | 3 |
| 3. Clypeus quadridentate | 4 |
| Clypeus bidentate | 9 |
| 4. Hind tibiae each with a single spur | 5 |
| Hind tibiae each with two spurs | <i>Canthon nigricornis</i> |
| 5. Hind femora margined in front; prothorax coarsely punctuate | |
| Hind femora not margined in front; prothorax not coarsely punctate | <i>C. perplexus</i> |
| | 6 |
| 6. Upper surface coarsely granulate | 7 |
| Upper surface finely granulate | 8 |
| 7. Subhumeral striae carinate | <i>C. praticola</i> |
| Subhumeral striae not carinate | <i>C. ebenus</i> |
| 8. Prothorax and pygidium finely punctate | <i>C. probus</i> |
| Prothorax and pygidium not punctate | <i>C. lecontei</i> |
| 9. Length less than 6 mm. | <i>C. viridis</i> |
| Length greater than 10 mm. | 10 |
| 10. Prothorax scabrous; pygidium finely granulate | <i>C. chalcites</i> |
| Prothorax coarsely granulate; pygidium coarsely granulate | 11 |
| 11. Eyes over half as wide as long when viewed from the dorsal side | |
| antennae ferruginous | <i>C. vigilans</i> |
| Eyes less than half as wide as long when viewed from the dorsal side; | |
| antennae fuscous | <i>C. imitator, C. laevis</i> |

Because *C. imitator* and *C. laevis* are very variable, not attempt has been made to distinguish between them. Brown (1946) and Robinson (1948b) use the following characters to distinguish *C. imitator* from *C. laevis*. Clypeus broadly, shallowly emarginate. Angle formed by the head (the rounded edge) of each lateral margin with the basal margin on the prothorax obtuse, well rounded. Submedian angle of each lateral prothoracic margin virtually equidistant from the anterior and posterior prothoracic angle. The banana-shaped mass of dense spinules on the distant part of the internal sac is five times as long as wide

Clypeus sharply, deeply emarginate. Angle formed by the bead of each lateral margin with the basal margin of the prothorax angular, sharply rounded. The distance from the basal angle to the submedian angle of each lateral prothoracic margin is three-fourths the distance from the latter angle to the anterior angle. The banana-shaped mass of dense spinules on the distal part of the internal sac is two times as long as wide

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|---|----------------------------|
| 12. Third segment of labial palpi distinct | 23 |
| Third segment of labial palpi small or inconspicuous | 13 |
| 13. Prothoracic disk granulate | 14 |
| Prothoracic disk punctate | 16 |
| 14. Surface of pronotum and/or elytra covered with fine cracks | 15 |
| Surface of pronotum and elytra between tubercles smooth and shining; in prairie dog burrows | <i>Onthophagus cynomys</i> |

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|-----|---|---------------------------------|
| 15. | Elytral intervals triserially tuberculate; male without basal cephalic horns <i>O. hecate hecate</i> | 17 |
| | Elytral intervals biserially punctate-tuberculate; green, blue, or black; male with short acute basal horn directed upward and outward behind each eye <i>O. medorensis</i> | 19 |
| 16. | Clypeus distinctly emarginate at apex | 17 |
| | Clypeus truncate or rounded at apex | 19 |
| 17. | Color of pronotum and elytra uniform | 18 |
| | Pronotum and elytra decidedly different in color <i>O. tuberculifrons</i> | 18 |
| 18. | Prothorax shining | <i>O. subaeneus</i> |
| | Prothorax dull | <i>O. knausi</i> |
| 19. | Prothorax and elytra uniformly metallic green or cupreous..... | <i>O. orpheus orpheus</i> |
| | Prothorax and elytra not as above | 20 |
| 20. | Prothorax more or less protuberant in front, shining | 21 |
| | Prothorax not protuberant in front, dull | 22 |
| 21. | Large, over 7.5 mm. | <i>O. cavernicollis</i> |
| | Under 7.5 mm. | <i>O. striatulus striatulus</i> |
| 22. | Pronotal punctures generally the same size, usually all with setae..... | <i>O. pennsylvanicus</i> |
| | Pronotal punctures of two sizes, very small punctures lacking setae scattered among the large punctures | <i>O. oklahomensis</i> |
| 23. | Tarsi without claws; front legs without tarsi | 24 |
| | Tarsi with claws; front legs with tarsi | 26 |
| 24. | Elytral striae barely indicated, punctures shallow | <i>Phanaeus triangularis</i> |
| | Elytral striae deep, punctures deep | 25 |
| 25. | Elytral intervals 1, 2, 3 and 4 costate | <i>P. vindex vindex</i> |
| | Elytral intervals 1, costate, 2, 3 and 4 not costate | <i>P. difformis</i> |
| 26. | Length greater than 20 mm. | <i>Dichotomius carolinus</i> |
| | Length less than 20 mm. | 27 |
| 27. | Elytra with 7 striae | 28 |
| | Elytra with 8 striae | 29 |
| 28. | Hind angle of the thorax right angled; side margin of the thorax when viewed sideways is nearly straight from front to hind angle..... | <i>Ateuchus histeroides</i> |
| | Hind angle of the thorax broadly rounded; side margin of thorax when viewed sideways is curved downwards in the anterior and posterior thirds | <i>A. lecontei</i> |
| 29. | Head and thorax shining; sides of thorax near apical angles not sinuate; length 8-10 mm. | <i>Copris minutus</i> |
| | Head and thorax opaque; sides of thorax near apical angles sinuate; length 13-19 mm. | <i>C. tullius</i> |

List of Species

Ateuchus Weber*Ateuchus* Weber, 1801. Observ. entomol. p. 10, 37.*Ateuchus* Fabricius, 1801. Syst. Eleuth. 1: 54.*Chaoeridium* Serville, 1825. Encycl. meth. 10: 356.

The key characters separating the two species are the only ones found

that are satisfactory for Oklahoma forms. These were taken from the works of Robinson (1948).

Ateuchus histeroides Weber

Ateuchus histeroides Weber, 1801. Observ. entomol. p. 37.
Ateuchus capistratum Fabricius, 1801. Syst. Eleuth. 1: 62.
Copris histeroides Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 205.
Choeridium histeroides Harold, 1873. Coleopt. Hefte 11: 107.

County records: Alfalfa, Cleveland (O.U.), Craig, McCurtain (O.U.), Ottawa, Payne.

Ateuchus lecontei (Harold)

Choeridium lecontei Harold, 1868. Coleopt. Hefte 4: 52.
Ateuchus lecontei: Chapin, 1946. Proc. Biol. Soc. Washington 59: 79.

County records: Cleveland (O. U.), Comanche, Latimer (O. U.).

Canthon Hoffmanssegg

Canthon Hoffmanssegg, 1817. Wiedam. Zool. Mag. 1: 38.
Coprobius Latreille, 1829. Regne anim. ed. II. 4: 535.
Hyboma Castelnau, 1840. Hist. Nat. Coleopt. 2: 74.
Coeloscelis Reiche, 1841. Rev. Zool. p. 213.
Tetraechma Blanchard, 1843. Voy d'Orbigny Am. Coleopt. p. 167.
Pseudocanthon Bates, 1887. Biol. Central Am. Coleopt. 2 (2): 35.

Canthon chalcites Haldeman

Canthon chalcites Haldeman, 1843. Proc. Acad. Nat. Sci. Philadelphia 1: 304.

Characteristics: Body purplish to black; clypeus not deeply emarginate, scabrous, not coarsely granulate, not punctate; antennae nonpubescent or pubescence not white, fuscous to black; prothorax not coarsely granulate, not punctate; elytra coarsely granulate, not punctate, subhumeral striae not carinate, coarsely granulate; sides of prothorax fimbriate, without transverse carina; posterior femora margined in front, coarsely setigerous punctate; hind tibiae each with a single spur.

County records: Adair, Alfalfa, Cleveland (O. U.), Delaware, Ellis, Harper, Latimer (O. U.), McCurtain, Pushmataha.

Canthon ebenus (Say)

Ateuchus ebenus Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 208.
Canthon ebenus: Harold, 1868. Berliner Entomol. Zeitschr. 12: 65.
Canthon ebenus: Horn, 1870. Trans. Am. Entomol. Soc. 3: 46.

Characteristics: Body black; clypeus deeply emarginate; antennae nonpubescent or with white pubescence, fuscous to black; sides of prothorax fimbriate beneath, without transverse carina; posterior femora coarsely setigerous punctate.

County records: Alfalfa, Caddo, Cimarron, Cleveland, Grady, Marshall, McCurtain (O. U.), Payne, Woods.

Canthon imitator Brown

Canthon imitator Brown, 1946. Canadian Entomol. 78: 104.

Characteristics: Body with faint reddish cast to black; clypeus deeply emarginate, not scabrous, not punctate; antennae nonpubescent or pubescence not white; prothorax not scabrous, coarsely granulate, not punctate;

elytra coarsely granulate, not punctate, subhumeral striae not carinate, coarsely granulate; sides of prothorax fimbriate beneath, without transverse carina; posterior femora margined in front, coarsely setigerous punctate; hind tibiae each with a single spur; pygidium coarsely granulate not punctate.

County record: Cleveland (O. U.).

Canthon laevis (Drury)

Scarabaeus pilularis Auct. (not Linné, 1758)

Scarabaeus laevis Drury, 1770. Illustr. exot. Ins. 1: 79.

Scarabaeus hudsonias Forster, 1781. Nova Spec. Inst. p. 3.

Scarabaeus volvens Fabricius, 1792. Entomol. Syst. 1: 66.

Canthon volvens: Castelnau, 1835. Hist. Nat. Coleopt. 2: 68.

Canthon obtusidens Ziegler, 1844. Proc. Acad. Nat. Sci. Philadelphia 2: 45.

Canthon laevis: LeConte, 1859. Coleopt. Kansas p. 10.

Characteristics: This species resembles *C. imitator* and because both *C. laevis* and *C. imitator* are very variable they are difficult to separate. The characters used by Brown (1946) and by Robinson (1948), may be used to distinguish *C. laevis* from *C. imitator*.

County records: Adair, Cherokee (O. U.), Cimarron, Cleveland, Comanche, Custer, Ellis, Grant, Harmon (O. U.), Jefferson (O. U.), Latimer (O. U.), Logan (O. U.), McClain (O. U.), McCurtain, Murray (O. U.), Noble, Oklahoma (O. U.), Osage, Pawnee, Payne, Pontotoc, Woodward.

Canthon lecontei Harold

Canthon lecontei Harold, 1868. Berliner Entomol. Zeitschr. 12: 110.

Characteristics: Body black; clypeus deeply emarginate, not scabrous, not punctate; antennae nonpubescent or with white pubescence, fuscous to black; prothorax not scabrous; subhumeral striae carinate; sides of prothorax fimbriate beneath, without transverse carina; posterior femora not coarsely setigerous punctate.

County records: Cleveland, Ellis, McCurtain, Noble, Osage.

Canthon nigricornis (Say)

Ateuchus nigricornis Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 207.

Canthon nigricornis: Robinson, 1941. Trans. Am. Entomol. Soc. 67: 129.

Characteristics: Body black; clypeus deeply or not deeply emarginate, not scabrous, coarsely granulate, not punctate; antennae nonpubescent or with white pubescence, fuscous to black; prothorax not scabrous, coarsely granulate, not punctate; elytra coarsely granulate, not punctate, subhumeral striae not carinate, coarsely granulate; sides of prothorax fimbriate beneath, without transverse carina; posterior femora not margined in front, not coarsely setigerous punctate; pygidium coarsely granulate, not punctate.

County records: Atoka, Cleveland (O. U.), Comanche (O. U.).

Canthon perplexus Leconte

Canthon perplexus Leconte, 1847. J. Acad. Nat. Sci. Philadelphia (Series II), 1: 85.

Characteristics: Body brown bronze, shining; clypeus deeply emarginate, not scabrous, finely granulate; antennae white pubescent, cream; prothorax not scabrous, finely granulate, coarsely punctate; elytra finely

granulate, not punctate, subhumeral striae not carinate, smooth; sides of prothorax with entire transverse carina; posterior femora not coarsely setigerous; pygidium finely granulate, coarsely punctate.

County records: McCurtain, Pontotoc.

Canthon praticola Leconte

Canthon praticola Leconte, 1859. Coleopt. Kansas p. 10.

Characteristics: Body black; clypeus deeply emarginate, not scabrous, not punctate; antennae nonpubescent or with white pubescence, fuscous to black; prothorax not scabrous; elytra not punctate; sides of prothorax fimbriate beneath, without transverse carina; posterior femora coarsely setigerous punctate, pygidium coarsely granulate, not punctate.

County records: Cimarron, Cleveland (O. U.), Comanche, Grady, Noble, Payne.

Canthon probus (Germar)

Ateuchus probus Germar, 1824. Ins. spec. nov. p. 98.

Canthon abrasus Leconte, 1859. Coleopt. Kansas p. 10.

Canthon probus : Harold, 1868. Berliner Entomol. Zeitschr. 12: 64.

Characteristics: The description of *C. probus* is essentially the same as that of *C. lecontei*. The key characters are sufficient to separate this species from *C. lecontei*.

County records: None, but likely to occur here.

Canthon vigilans Leconte

Canthon vigilans Leconte, 1858. J. Acad. Nat. Sci. Philadelphia (Series II), 4: 16.

Characteristics: The description of *C. vigilans* is essentially the same as that of *C. imitator* and *C. laevis*. *C. vigilans* differs in that the antennae are ferruginous.

County records: Cleveland (O. U.), Comanche (O. U.), Delaware, Dewey, Marshall, McClain (O. U.), McCurtain, Pontotoc, Roger Mills.

Canthon viridis (Beauvois)

Copris viridis Beauvois, 1805. Ins. Afr. et Am. p. 23.

Ateuchus obsoletus Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 208.

Onthophagus viridicatus Say, 1835. Boston J. Nat. History 1: 173.

Canthon viridis : Harold, 1868. Berliner Entomol. Zeitschr. 12: 112.

Characteristics: This species differs from *C. perplexus* in that the clypeus is bidentate; the body green to bronze; antennae fuscous to black; posterior femora not margined in front.

County record: Comanche (O. U.).

Copris Geoffroy

Copris Geoffroy, 1762. Ins. des envir. de Paris 1: 87.

Litocopris Waterhouse, 1891. Ann. Mag. Nat. History 8: 53.

The key characters separating the two species are satisfactory for Oklahoma forms; thus, no further description for the species is included.

Copris minutus (Drury)

Scarabaeus minutus Drury, 1773. Illustr. exot. Ins. 2: 78.

- Copris ammon* Fabricius, 1781. Spec. Ins. 1: 24.
Copris lar Fabricius, 1787. Mant. Ins. 1: 13.
Copris reflexus Panzer, 1794. Fauna Insect. Am. p. 7.
Copris silenus Fabricius, 1775. Syst. Entomol. p. 21.
Copris minutus: Schaeffer, 1906. Trans. Am. Entomol. Soc. 32: 255.
 County records: Mayes, Payne, Sequoyah.

Copris tullius Olivier

- Copris tullius* Olivier, 1789. Entomol. I, Scarab. p. 118.
Copris anaglypticus Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 204.

County records: Canadian, Cleveland (O. U.), Comanche (O. U.), Dewey, Grady (O. U.), Kiowa, Marshall, McCurtain, Oklahoma (O. U.), Pawnee, Payne, Pontotoc, Roger Mills, Washington.

Deltochilum Eschscholtz

- Deltochilum* Eschscholtz, 1822. Entomogr. 1: 37.
Anamesis Vigors, 1826. Zool. J. 2: 510.
Hyboma Serville, 1828. Encycl. meth. 10: 352.
Hybomidium Shipp, 1897. Entomol. Nachr. 23: 195.

Characteristics: The large size, dorso-ventrally flattened body, black color, and key characters are sufficient to identify the single Oklahoma species of *Deltochilum*.

Deltochilum gibbosum (Fabricius)

- Scarabaeus gibbosum* Fabricius, 1775. Syst. Entomol. p. 28.
Deltochilum gibbosum: Bates, 1887. Biol. Central Am. Coleopt. 2 (2): 36.

County records: McCurtain, Ottawa, Pushmataha.

Dichotomius Hope

- Dichotomius* Hope, 1838. Entomol. Mag. 5: 321.
Brachycopris Haldeman, 1845. Proc. Acad. Nat. Sci. Philadelphia 3: 125.
Pinotus Erichson. According to Blackwelder (1939) and Arnett (1960) *Pinotus* Erichson is not a North American genus, although in the past *D. carolinus* was placed in the genus *Pinotus*.

Characteristics: The large robust size, black shining color, elytral striations, and key characters are sufficient to distinguish this species.

Dichotomius carolinus (Linné)

- Scarabaeus carolinus* Linné, 1767. Syst. Nat. (12th ed.). 1: 545.
Pinotus carolinus Bates, 1887. Biol. Central Am. Coleopt. 2 (2): 52.
Dichotomius carolinus: Arnett, 1960. Beetles of the U.S. p. 412.

County records: Adair, Atoka, Bryan, Cleveland (O. U.), Comanche (O. U.), LeFlore, Marshall, McCurtain, Muskogee, Okfuskee, Pawnee, Payne, Sequoyah, Washington.

Onthophagus Latreille

- Onthophagus* Latreille, 1802. Hist. Nat. Crust. Ins. 3: 141.
Chalcodens Erichson, 1848. Naturg. Ins. Deutschl. Coleopt. 3: 763.
Monapus Erichson, 1848. Loc. cit.
Psilax Erichson, 1848. Loc. cit.
Gonocypheus Lansberge, 1885. Ann. Mus. Civ. Genova 2 (2): 382.
Tauronthophagus Shipp, 1895. Entomol. 28: 179.

Onthophagus cavernicollis Howden and Cartwright

Onthophagus brevivrons Horn, 1881. Trans. Kansas Acad. Sci. 7: 76.
Onthophagus cavernicollis Howden and Cartwright, 1963. Proc. U.S. Nat. Mus. 114: 32.

Characteristics: Prothorax bright green, elytra black; lower cephalic carina of male absent, upper cephalic carina in male prominent, without protuberances, lower cephalic carina of female prominent, upper cephalic carina of female prominent, with small horns; base of prothorax without narrow elevated margin; elytra with second and following intervals a confused triseriate punctation.

County record: Adair.

Onthophagus cynomysi Brown

Onthophagus cynomysi Brown, 1927. Canadian Entomol. 54: 131.

Characteristics: Length 6.3-10 mm; prothorax shining; lower cephalic carina of both sexes prominent, upper cephalic carina in well developed males feeble at middle, on each side elevated into an acute tubercle, in less developed males strongly bicarinate with tubercles feeble or absent, upper carina of female prominent without protuberances; prothorax finely and sparsely granulate, the granules closer anteriorly, median lobe of male elongate, broad and deeply anteriorly emarginate without bidentate processes within the apical emargination, anteriorly produced in the females into a very short broad protuberance, base without narrow elevated margin; elytra with second and following intervals a confused triseriate punctation.

County records: Cleveland, Grady (O. U.), Noble, Payne.

Onthophagus hecate hecate (Panzer)

- Scarabaeus hecate* Panzer, 1794. Faun. Bor. Am. p. 5.
Copris hastator Fabricius, 1798. Syst. Entomol. Suppl. p. 28.
Copris latebrosus Fabricius, 1801. Syst. Eleuth. 1: 34.
Copris obtectus Beauvois, 1805. Ins. Afr. et Am. p. 2.
Onthophagus latebrosus : Sturm, 1826. Cat. Ins-Sammlung. Käfer 1: 178.
Onthophagus furcicollis Dejean, 1836. Cat. des Coleopt. collection de M. le Comte Dejean, Paris p. 157.
Onthophagus lama Dejean, 1836. Loc. cit.
Onthophagus scabricollis Kirby, 1837. Fauna Bor. Am. 4: 126.
Onthophagus sayi Laporte, 1840. Hist. Nat. Coleopt. 2: 87.
Onthophagus hecate : Sturm, 1843. Catalog der Kaefer-Sammlung von Jacob Sturm p. 107.
Onthophagus obtectus : Haldeman and LeConte, 1853. Smithson. Inst., Washington p. 54.
Onthophagus hastator : Lacordaire, 1856. Hist. Nat. des Ins. p. 108.

Characteristics: Length 9 mm; prothorax dull; anterior margin of clypeus rounded or prolonged into more or less prominent subtriangular process, not emarginate, lower cephalic carina prominent, upper cephalic carina of male very faint or absent, upper cephalic carina of female prominent without protuberances; median lobe of prothorax in male an elongate broad process which is anteriorly emarginate, with small bidentate processes within the apical emargination, anteriorly produced in female into a very short broad protuberance, base without narrow elevated margin.

County records: Alfalfa, Cleveland (O. U.), Comanche, Craig, Latimer, McClain (O. U.), McCurtain, Ottawa, Payne, Sequoyah, Texas.

Onthophagus knausi Brown

Onthophagus anthracinus Dawson, 1924. (not Harold, 1873). Nebraska Univ. Stud. 22: 73.

Onthophagus knausi Brown, 1927. Canadian Entomol. 54: 128.

Characteristics: Length 5-6.5 mm; prothorax dull; prothorax and elytra brownish color with very feeble bronze luster; male clypeus without cephalic carinae or protuberance, female with upper and lower carinae prominent without protuberances; prothorax not granulate, base without narrow elevated line; elytra with second and following intervals biserially punctate.

County records: None, but likely to occur here.

Onthophagus medorensis Brown

Onthophagus guatemalensis Schaeffer, 1914 (not Bates, 1887). J. New York Entomol. Soc. 22: 295.

Onthophagus medorensis Brown, 1929. Canadian Entomol. 56: 204.

Characteristics: Length 7-9 mm; prothorax dull; anterior margin of clypeus of both sexes truncate or rounded, not emarginate, lower cephalic carina prominent, in more developed males the upper cephalic carina is produced on each side into a more or less distinct acute tubercle, in less developed males the cephalic prominences are nearly as in *O. hecate*, upper carina of female prominent with no protuberances; prothoracic median lobe, in well developed males, strongly produced and furcate, in less developed males the median lobe is nearly as in *O. hecate*, anteriorly produced in the female into a very short, broad, protuberance, base without narrow elevated margin.

County records: Cleveland (O. U.), Grady (O. U.).

Onthophagus oklahomensis Brown

Onthophagus oklahomensis Brown, 1927. Canadian Entomol. 54: 128.

Characteristics: The description of *O. oklahomensis* is essentially the same as *O. pennsylvanicus*. The key characters are sufficient to separate this species from *O. pennsylvanicus*.

County records: Cleveland (O. U.), Comanche (O. U.), Grady, Latimer, Payne.

Onthophagus orpheus orpheus (Panzer)

Scarabaeus orpheus Panzer, 1794. Faun. Bor. Am. p. 5.

Onthophagus orpheus : Sturm, 1843. Catalog der Kaefer-Sammlung von Jacob Sturm, p. 107.

Characteristics: The description of *O. orpheus* is essentially the same as *O. cynomysi*. It is separated from the latter by the following: (1) pronotal surface punctate and not granulate, (2) prothorax and elytra metallic green or coppery.

County record: Payne.

Onthophagus pennsylvanicus Harold

Onthophagus ovatus Melsheimer, 1806 (not Linnaeus, 1767). Cat. Ins. Pennsylvania p. 4.

Onthophagus moeris Sturm, 1826. Cat. Ins-Sammlung. Käfer 1: 178, *nomen nudum*.

Onthophagus pennsylvanicus Dejean, 1836. Cat. des Coleopt. collec-

tion de M. le Comte Dejean, Paris p. 158, *nomen nudum*.

Onthophagus pennsylvanicus Sturm, 1843. Catalog der Kaefer, Sammlung von Jacob Sturm p. 108, *nomen nudum*.

Onthophagus pennsylvanicus Gemminger and Harold, 1869. Cat. Coleopt. 4: 1034, *nomen nudum*.

Onthophagus pennsylvanicus Harold, 1871. Coleopt. Hefte 8: 115.

Onthophagus falcipes Harold, 1871. Coleopt. Hefte 8: 115.

Characteristics: Length 3.5-5 mm; prothorax and elytra black or brownish black; lower cephalic carina of male absent, upper cephalic carina in male faintly indicated to absent, without protuberances, lower cephalic carina of female absent to distinct, upper cephalic carina of female absent to faintly indicated, without protuberances; base of prothorax without narrow elevated margin; elytra with second and following intervals biserially punctate.

County records: Alfalfa, Beckham, Comanche (O. U.), Dewey, Grady, Harmon, LeFlore, McClain (O. U.), McCurtain, Murray, Payne.

Onthophagus striatulus striatulus (Beauvois)

Scarabaeus janus Panzer, 1794. Faun. Bor. Am. p. 5.

Onthophagus niger Melsheimer, 1806. Cat. Ins. Pennsylvania p. 3.

Copris striatulus Beauvois, 1809. Ins. Afr. et Am. p. 92.

Onthophagus cervicornis Kirby, 1825. Trans. Linn. Soc. London 14: 565.

Onthophagus striatulus : Sturm, 1826. Cat. Ins-Sammlung. Käfer 1: 178.

Onthophagus janus : Dejean, 1836. Cat. des Coleopt. collection de M. le Comte Dejean, Paris p. 158.

Onthophagus castaneus Melsheimer, 1845. Proc. Acad. Nat. Sci. Philadelphia 2: 134.

Onthophagus cavicornis Haldeman and LeConte, 1853. Smithson. Inst., Washington p. 54.

Onthophagus viridicollis Gemminger and Harold, 1869. Cat. Coleopt. 4: 1030.

Onthophagus scabricollis Horn, 1875. Trans. Am. Entomol. Soc. 5: 139.

Onthophagus canadensis Horn, 1875 (not Fabricius, 1801). Loc. cit.

Onthophagus subaeneus Horn, 1875 (not Beauvois, 1811). Loc. cit.

Onthophagus concinnus Horn, 1875 (not Laporte, 1840). Loc. cit.

Onthophagus protensus Horn, 1875 (not Melsheimer, 1845). Loc. cit.

Onthophagus orpheus Horn, 1875 (not Panzer, 1794). Loc. cit.

Characteristics: Length 4-7.5 mm; prothorax with aeneous or cupreous tint, elytra piceous with feeble aeneous tint; lower cephalic carina of male absent, upper cephalic carina feeble and on each side produced into an acute tubercle or slender horn, both cephalic carinae in female prominent without protuberances; base of prothorax without a narrow elevated margin; elytra with second and following intervals a confused triserial punctation.

County record: Latimer (O. U.).

Onthophagus subaeneus (Beauvois)

Copris subaeneus Beauvois, 1811. Ins. Afr. et Am. p. 105.

Onthophagus subaeneus : Haldeman and LeConte, 1853. Smithson. Inst. Washington p. 54.

Onthophagus cribricollis Horn, 1881. Trans. Kansas Acad. Sci. 7: 76.

Characteristics: Length 4-7.5 mm; anterior margin of clypeus of both sexes rounded or prolonged into a more or less prominent subtriangular process, lower cephalic carina prominent, upper cephalic carina of male produced laterally into short horns or acute tubercles, upper carina

of female prominent, without protuberances; median lobe of prothorax in male an elongate broad process which is anteriorly emarginate, without bidentate processes within the apical emargination, anteriorly produced in the female into a very short broad protuberance, base without narrow elevated margin; elytra with second and following intervals biserially punctate.

County record: Payne.

Onthophagus tuberculifrons Harold

Onthophagus tuberculifrons Sturm, 1843. Catalog der Kaefer-Sammlung von Jacob Sturm p. 108, *nomen nudum*.

Onthophagus tuberculifrons Gemminger and Harold, 1869. Cat. Coleopt. 4: 1038, *nomen nudum*.

Onthophagus tuberculatus : Gemminger and Harold, 1869. Cat. Coleopt. 4: 1038, *nomen nudum*.

Onthophagus tuberculifrons Harold, 1871. Coleopt. Hefte 8: 115.

Onthophagus tuberculatus Harold, 1871. Coleopt. Hefte 8: 115.

Characteristics: Length 3.5-5 mm; prothorax and elytra black or brownish black; lower carina in both sexes feeble or absent, upper carina in both sexes represented by two more or less distinct tubercles; base of prothorax without narrow elevated margin; elytra with second and following intervals biserially punctate.

County records: Murray, Payne.

Phanaeus MacLeay

Phanaeus MacLeay, 1819. Horae Entomol. 1: 124.

Lonchophorus Germar, 1824. Ins. spec. nov. p. 106.

Phanaeus difformis Leconte

Phanaeus difformis Leconte, 1847. J. Acad. Nat. Sci. Philadelphia (ser. II) 1: 86.

Characteristics: The description of *P. difformis* is essentially the same as that of *P. vindex*. The key characters are sufficient to separate this species from *P. triangularis* and *P. vindex*.

County records: Cleveland (O. U.), Grady (O. U.), Major (O. U.).

Phanaeus triangularis (Say)

Copris triangularis Say, 1823. J. Acad. Nat. Sci. Philadelphia 3: 206.

Phanaeus triangularis : Blanchard, 1885. Trans. Am. Entomol. Soc. 12: 168.

Characteristics: The key characters are sufficient to separate this species from that of *P. difformis* and *P. vindex*. The color is variable; opaque, black, dull cupreous or green.

County records: None, but likely to occur here.

Phanaeus vindex MacLeay

Scarabaeus carnifex Linné, 1767 (not Linné 1758). Syst. Nat. (12th ed.) 1: 546.

Phanaeus vindex MacLeay, 1819. Horae Entomol. 1: 133.

Characteristics: Clypeus and pronotum yellowish green, disk of pronotum cupreous in both sexes, elytra green to purplish, entire color iridescent; male with long curved acute black horn on clypeus; pronotal disk with posterior angles produced into flattened, subacute projections; fe-

male with short horn on clypeus; anterior part of pronotum with black raised transverse line.

County records: Canadian (O.U.), Cherokee, Choctaw, Cimarron, Cleveland (O. U.), Comanche (O. U.), Cotton, Craig, Custer, Ellis, Grady, Latimer (O. U.), Logan (O. U.), McClain (O. U.), McCurtain, Oklahoma, Osage, Pawnee, Payne, Pushmataha, Texas.

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