Name: F. Lance Wallace Date of Degree: August 8, 1964

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: THE SCARABAEINAE OF OKLAHOMA (SCARABAEIDAE, COLEOPTERA)

Pages in Study: 31 Candidate for Degree of Master of Science

Major Field: Natural Science

Scope of Study: A taxonomic study of the Scarabaeinae known to be in Oklahoma, including probable state species, was made. This study was based primarily on collection records and specimens located in the Oklahoma State University and Oklahoma University Museums.

Findings and Conclusions: Thirty-one species representing seven genera are included in this paper. Keys, descriptions, and distribution data are given for these species.

ADVISER'S APPROVAL F. Lance Wallace

THE SCARABAEINAE OF OKLAHOMA (SCARABAEIDAE, COLEOPTERA)

by

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1960

Submitted to the faculty of the Graduate School of
the Oklahoma State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
August, 1964

THE SCARABAEINAE OF OKLAHOMA (SCARABAEIDAE, COLEOPTERA)

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INTRODUCTION

Approximately 74 species of beetles belonging to the subfamily Scarabaeinae, are present in the United States. This work contains only those species that are recorded in Oklahoma. This includes 7 genera containing 31 species of which 28 are known to occur in the state and three are likely to occur here. The principal parts are a key to the adult forms, synonymy, descriptions and distribution records. 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, 1948), Schaeffer (1906, 1914), and Howden and Cartwright (1963).

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

The distribution of specimens in the Stovall Museum, University of Oklahoma (O. U.) are listed only when they represent additional data.

The beetles belonging to the subfamily Scarabaeinae are generally coprophagous--the most common food being manure. The food may vary 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 have been described in connection with the description of the species.

I wish to thank my major advisor, Dr. William A. Drew, for his assistance, encouragement and guidance, and Dr. L. H. Bruneau for his guidance in the preparation of this paper. I also wish to acknowledge the following individuals and institutions for their interest and loan of specimens: Drs. G. W. Byers, University of Kansas; H. R. Burke, Texas Agricultural and Mechanical University; C. Hopla, University of Oklahoma.

Also sincere thanks are expressed to Mrs. Sally Ann Jefferson for typing the manuscript.

SYSTEMATICS

Key to the Scarabaeinae of Oklahoma

1. Middle and posterior tibiae slender, curved, scarcely enlarged at the extremity; head and thorax always unarmed 2

   Middle and posterior tibiae dilated at the extremity; usually one or both sexes with head or thorax armed. 12

2. Anterior tarsi absent; elytral epipleural fold broad. . . . . .Deltochilum gibbosum

   Anterior tarsi short but present; elytral epipleural fold narrow or absent. 3

3. Clypeus quadridentate 4

   Clypeus bidentate 9

4. Hind tibiae each with a single spur 5

   Hind tibiae each with two spurs . . . . . Canthon nigricornis

5. Hind femora margined in front; prothorax coarsely punctate. . . . . .C. perplexus

   Hind femora not margined in front; prothorax not coarsely punctate. 6

6. Upper surface coarsely granulate. 7

   Upper surface finely granulate. 8

7. Subhumeral stria carinate . . . . . C. praticola

   Subhumeral stria not carinate . . . . . C. ebenus

8. Prothorax and pygidium finely punctate. . . . . C. probus

   Prothorax and pygidium not punctate . . . . . C. lecontei

9. Length less than 6 mm. . . . . C. viridis

Length greater than 10 mm. 10

10. Prothorax scabrous; pygidium finely granulate. . . . . C. chalcites

Prothorax coarsely granulate; pygidium coarsely granulate. 11

11. Eyes over half as wide as long when viewed from the dorsal side (Fig. 2); antennae ferruginous . . . . . .C. vigilans

Eyes less than half as wide as long when viewed from the dorsal side (Fig. 1); antennae fuscous . . . . . C. imitator, C. laevis

Because C. imitator and C. laevis are very variable, no attempt has been made to distinguish between them. Robinson (1948) uses the following characters to distinguish C. imitator from C. laevis.

Clypeus broadly, shallowly emarginate. Angle formed by the bead 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 distal part of the internal sac is five times as long as wide . . . . . C. laevis

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 . . . . C. imitator

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 finely alutaceous 15

Surface of pronotum and elytra between tubercles smooth and shining; in prairie dog burrows. . . . . Onthophagus cynomysi

15. Elytral intervals triserially tuberculate; male without basal cephalic horns. . . . . O. hecate hecate

Elytral intervals biserially punctate-tuberculate; green, blue, or black; male with short acute basal horn directed upward and outward behind each eye . . . . . .O. medorensis

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. .O. tuberculifrons

18. Prothorax shining . . . . . O. subaeneus

Prothorax dull. . . . . .O. knausi

19. Prothorax and elytra uniformly metallic green or cupreous . . . . O. orpheus orpheus

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 species over 7.5 mm . . . . . O. cavernicollis

Species under 7.5 mm. . . . . O. striatulus striatulus

22. Pronotal punctures generally the same size, usually all with setae . . . . . .O. pennsylvanicus

Pronotal punctures of two sizes, very small punctures lacking setae scattered among the large punctures . . . . . .O. oklahomensis

23. Tarsi without claws; front legs without tarsi 24

Tarsi with claws; front legs with tarsi 26

24. Elytral striae barely indicated, punctures shallow. . . . . .Phanaeus triangularis

Elytral striae deep, punctures deep 25

25. Elytral intervals 1, 2, 3 and 4 costate . . . . . P. vindex vindex

Elytral intervals 1, costate, 2, 3 and 4 not costate. . . . . P. difformis difformis

26. Length greater than 20 mm . . . . . .Dichotomius carolinus

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 . . . . . Ateuchus histeroides histeroides

Hind angle of the thorax broadly rounded; side margin of thorax when viewed sideways is curved downwards in the anterior and posterior thirds. . . . . .A. lecontei

29. Head and thorax shining; sides of thorax near apical angles not sinuate; length 8-10 mm. . . . . .Copris minutus

Head and thorax opaque; sides of thorax near apical angles sinuate; length 13-19 mm. . . . . .C. tullius

List of Species

Ateuchus Weber

Ateuchus Weber, 1801. Observ. entomol. p. 10, 37.

Ateuchus Fabricius, 1801. Syst. Eleuth. 1: 54.

Choeridium 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 Hoffmansegg

Canthon Hoffmansegg, 1817. Wiedam. Zool. Mag. 1: 38.

Coprobius Latreille, 1829. Regne anim. ed. II. 4: 535.

Hyboma Castelnau, 1840. History 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; eyes as in fig. 1; antennae nonpubescent or pubescence not white, fuscous to black; prothorax not coarsely granulate, not punctate; elytra coarsely granulate, not punctate, subhumeral stria 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 ebeneus : Harold, 1868. Berliner Entomol. Zeitschr. 12: 65.

Canthon ebenus : Horn, 1870. Trans. Am. Entomol. Soc. 3: 46.

Characteristics: Body black; clypeus deeply emarginate; eyes as in fig. 1; 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; eyes as in fig. 1; antennae nonpubescent or pubescence not white; prothorax not scabrous, coarsely granulate, not punctate; elytra coarsely granulate, not punctate, subhumeral stria 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 Linné, 1758. Syst. Nat. (10th ed.) p. 349.

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. History 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 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; eyes as in fig. 1; antennae nonpubescent or with white pubescence, fuscous to black; prothorax not scabrous; subhumeral stria 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; eyes as in fig. 1; antennae nonpubescent or with white pubescence, fuscous to black; prothorax not scabrous, coarsely granulate, not punctate; elytra coarsely granulate, not punctate, subhumeral stria 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 1: 85.

Characteristics: Body brown bronze, shining; clypeus deeply emarginate, not scabrous, finely granulate; eyes as in fig. 2; antennae white pubescent, cream; prothorax not scabrous, finely granulate, coarsely punctate; elytra finely granulate, not punctate, subhumeral stria 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 practicola Leconte

Canthon practicola Leconte, 1859. Coleopt. of Kansas p. 10.

Characteristics: Body black; clypeus deeply emarginate, not scabrous, not punctate; eyes as in fig. 1; 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. of Kansas p. 10.

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

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

County records: Not found in Oklahoma but likely to occur here.

Canthon vigilans Leconte

Canthon vigilans Leconte, 1858. J. Acad. Nat. Sci. Philadelphia 4: 16.

Characteristics: The description of C. vigilans is essentially the same as C. imitator and C. laevis. C. vigilans differs in that the eyes are like those illustrated in fig. 2, and 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; eyes as in fig. 1; 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 has been 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, Worthington.

Deltochilum Eschscholtz

Deltochilum Eschscholtz, 1822. Entomogr. 1: 37.

Annamesis 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-ventral flattened body, black color, and key characters are sufficient to separate the single Oklahoma species of Deltochilum; thus, no further description for the species has been included.

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 (of authors).

Characteristics: According to Blackwelder (1939) and Arnett (1960) Pinotus is not a North American genus. In the past Erichson (1847) placed D. carolinus in the genus Pinotus; however, Arnett (1960) places it in Dichotomius. 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. History Nat. Crust. Ins. 3: 141.

Chalcodeus Erichson, 1848. Naturg. Ins. Deutschl. Coleopt. 3: 763.

Monapus Erichson, 1848. Loc. cit.

Psilax Erichson, 1848. Loc. cit.

Gonocyphus Lansberge, 1885. Ann. Mus. Civ. Genova 2 (2): 382.

Tauronthophagus Shipp, 1895. Entomol. 28: 179.

Onthophagus cavernicollis Howden and Cartwright

Onthophagus brevifrons 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 prominant, without protuberances, lower cephalic carina of female prominant, upper cephalic carina of female prominant, 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 prominant, 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 prominant 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. Prodr. 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. Histoire nat. des 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. Histoire nat. des ins. p. 108.

Characteristics: Length 9 mm; prothorax dull; anterior margin of clypeus rounded or prolonged into more or less prominant subtriangular process, not emarginate, lower cephalic carina prominant, upper cephalic carina of male very faint or absent, upper cephalic carina of female prominant 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 lustri; male clypeus without cephalic carinae or protuberance, female with upper and lower carinae prominant without protuberances; prothorax not granulate, base without narrow elevated line; elytra with second and following intervals biseriately punctate.

County records: Not found in Oklahoma 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 prominant, in more developed males the upper cephalic carina is produced on each side into more or less distinct acute tubercle, in less developed males the cephalic prominances are nearly as in O. hecate, upper carina of female prominant 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. Prod. 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. collection 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 biseriately 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. Prodr. 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 prominant without protuberances; base of prothorax without a narrow elevated margin; elytra with second and following intervals a confused triseriate 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 prominant subtriangular process, lower cephalic carina prominant, upper cephalic carina of male produced laterally into short horns or acute tubercles, upper carina of female prominant, 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 biseriately 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 biseriately 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 1: 86.

Characteristics: The description of P. difformis is essentially the same as 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: Not found in Oklahoma 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 irridescent; male with long curved acute black horn on clypeus; pronotal disk with posterior angles produced into flattened, subacute projections; female 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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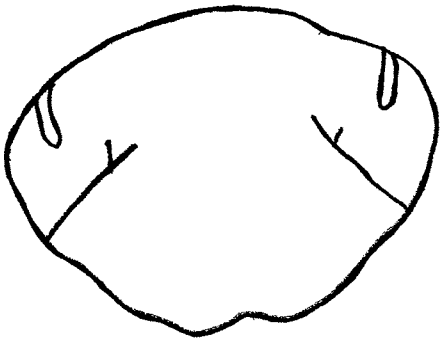
PLATE I

Cephalic view of clypeus and head indicating size of eyes. Figures are not drawn to scale.

Fig. 1. Canthon laevis (Drury)

Fig. 2. Canthon vigilans Leconte



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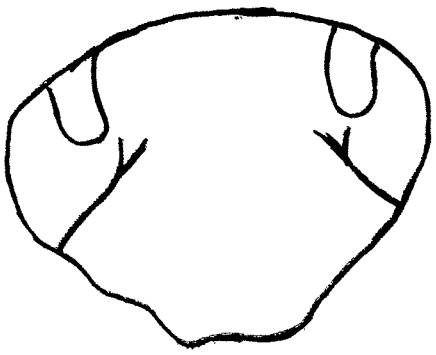

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