The Dytiscidae (Coleoptera) of Utah: keys, original citation, types and Utah distribution

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THE DYTCICIDA (COLEOPTERA) OF UTAH: KEYS, ORIGINAL CITATION, TYPES AND UTAH DISTRIBUTION

Russell D. Anderson

A review of the voluminous literature dealing with the family Dytiscidae reveals that very little has been published about the Utah dytiscid fauna. The principal studies are the unpublished master's theses of Chandler (1941) and Todd (1952). Chandler (op. cit.) prepared the most extensive list which includes 63 species; however, two these Hydroporus vilis LeConte and Hydroporus trisitis Paykull were included on the basis of their known distribution and not on locally collected specimens. Four other species Hydroporus sinuatipes Fall, Hydroporus hardyi Sharp, Cybister fimbriolatus (Say) and Agabinus sculpturellus Zimmerman, have been deleted as mis-identifications. Todd's (op. cit.) study was on the adult dytiscids of the Provo River and didn't include any new records. Beck (1954) included 29 dytiscid species in his study of the plateau region and surrounding portions of Wayne, Kane and Garfield Counties. Leech (1938) and Tanner (1928, 1934, 1940) also noted the occurrence of limited numbers of dytiscid species in Utah. Musser (1959) reported on 9 dytiscid genera including 5 specific determinations from the Glen Canyon portion of the Colorado River. Putnam (1876) reported on 12 species collected in Utah county; the specimens were determined by Henry Ulke. Two of these, Bidessus cinctellus (LeConte) and Agabus fimbriatus (LeConte), have never been collected again from the area and as the original specimens were unavailable for study they have not been included in the present list.

In the present paper an attempt has been made to present workable keys to the genera and species of adult dytiscids of Utah; provide an annotated check list of the species in Utah including original citations, type repository, type locality, and Utah distribution. In the interest of space the distribution is by county except in the case of those species with only a few locality records. There are also at least two undescribed dytiscid species known to occur in Utah. I plan to describe these in the future.

KEY TO THE GENERA OF ADULT UTAH DYTCICIDA

1. Mesoscutellum covered by hind margin of pronotum; protarsi and mesotarsi 4-segmented or 5-segmented with the 4th usually much shorter than the 3rd (except in Laccophilus) 2

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Mesoscutellum entirely visible; protarsi and mesotarsi 5-segmented with the 4th approximately as long as the 3rd .... 8

2. Base of prosternum and its postcoxal process in the same plane; protarsi and mesotarsi distinctly 5-segmented; metatarsi with a single straight claw .......... Laccophus

Base of prosternum and its postcoxal process not in the same plane; protarsi and mesotarsi having 4th segment hidden between lobes of 3rd segment ........................................ 3

3. Broad apex of metacoxal processes divided into 3 parts, 2 widely separated narrow lateral lobes and a broad depressed middle region, triangular at its tip .................. Hydrovatus

Metacoxal processes not divided into 3 parts as described above; but either without lobes or with these lobes covering base of trochanters ........................................ 4

4. Metacoxal processes without lateral lobes, bases of metathoracic trochanters entirely free; metatibia slightly arcuate; epipleura without a diagonal carina near base ......... Bidesus

Metacoxal processes with lateral lobes covering at least in part the bases of metathoracic trochanters; metatibia straight; epipleura with or without diagonal carina near base .......... 5

5. A diagonal carina crossing epipleura near base; protarsi and mesotarsi 4-segmented; epipleura of elytra with basal excavation ........................................ Hygrotus

Without diagonal carina on epipleura; protarsi and mesotarsi 5-segmented, 4th partly hidden; epipleura of elytra without basal excavation ........................................ 6

6. Mesial line between metacoxal processes never abbreviated; posterior margins of metacoxal processes (best viewed with head of insect toward observer) virtually straight across or sinuate or obtusely angulate ......................... Hydroporus

Mesial line between metacoxal processes more or less abbreviated behind; posterior margins of metacoxal processes slightly to deeply incised at middle ......................................... 7

7. Ventral surface of body subgranulate to densely micro-punctate, lacking scattered large punctures; pronotum without longitudinal sublateral plica; metafemora densely punctate over entire surface ........................................ Deronectes

Ventral surface of body more or less finely punctate with scattered coarser punctures; pronotum with longitudinal sublateral plica; metafemora with a median line of setiferous punctures, otherwise sparsely punctate .......... Oreodytes

8. Eyes emarginate above bases of antennae; first 3 segments of protarsi of male widened but never forming a round plate .............................................. 9

Eyes not emarginate above bases of antennae; first 3 segments of protarsi of male greatly widened, forming a nearly round or oval plate with adhesion discs ........................................ 14
9. Metafemora with a linear group of cilia near the posteriodistal angle ............................................................... 10
Metafemora without such a group of cilia ........................................ 12
10. Metacoxal processes parallel sided, lateral margins straight to apices ................................................. *Agabinus*
Metacoxal processes in form of rounded lobes ........................................ 11
11. Metatarsal claws equal in length; female genital valves simple ................................................. *Agabus*
Metatarsal claws obviously unequal, outer one of each pair much shorter than inner claw; female genital valves sawlike and laterally compressed ......................... *Ilybius*
12. Metatarsal claws virtually equal in length; terminal segment of labial palpi emarginate at apex; smaller species, less than 9 mm. long ........................................... *Coptotomus*
Metatarsal claws obviously unequal, outer ones shorter than inner; terminal segment of labial palpi simple at apex; larger species, great than 9 mm. long ....................................... 13
13. Metasternum between mesocoxae deeply, triangularly, split to receive tip of prosternal process; pronotum margined; elytral reticulation lightly impressed, meshes of unequal size and shape ................................................. *Rhantus*
Metasternum between mesocoxae with a shallow depression, never a sharply outlined, triangular excavation; pronotum not margined; elytral sculpture consisting of numerous parallel transverse grooves ........................................ *Colymbetes*
14. Inferior spur at apex of metatibiae dilated, much broader than the other spur; first 3 segments of protarsi of male forming a transversely oval adhesion disc, with 3 or 4 transverse rows of petiolate adhesive plates .............................. *Cybister*
Inferior spur not or but little broader than the other spur; first 3 segments of protarsi of male forming a nearly round adhesion disc ........................................ 15
15. Distal margins of first 4 metatarsal segments bare; large beetles, greater than 20 mm. long ..................... *Dytiscus*
Distal margins of first 4 metatarsal segments beset with a fringe of flat golden setae; smaller beetles less than 19 mm. long ........................................ 16
16. Prosternal process sharply pointed; pronotum margined laterally; lateral edge of elytron from behind middle to about apical 5th margined with short spines ......................................... *Eretes*
Prosternal process rounded; pronotum not margined laterally; elytra without spines on lateral edge ......................... 17
17. Outer metatibial spur acute; outer margin of metasternal wing straight ........................................... *Hydaticus*
Outer metatibial spur blunt, more or less emarginate; outer margin of metasternal wing arcuate ................................. 18
18. Ventral and dorsal surface coarsely punctate; elytra usually fluted and hairy in female; protarsal adhesion disc of male with one large basal, and two small median suction cups .................................................. Acilius

Ventral and dorsal surface almost smooth, with micropunctuation; elytra not fluted or hairy in female; protarsal adhesion disc of male with 4 to 6 large and many smaller suction cups .................................................. Graphoderus

19. Elytral ground color yellow, uniformly speckled or vermiculate with black; hind margin of mesofemora with a series of stiff setae which are only about half as long as femora are wide .................................................. Thermonectus

Elytral ground color black with yellow maculae or transverse bands, or yellow with black spots, or irrorate; hind margin of mesofemora with a series of stiff setae which are as long or longer than the femora are wide (often broken off) .................................................. Thermonectus

Species Keys, and Accounts

**Laccophilus** Leach 1817

1. Metasternum and metacoxal plates black, abdominal sterna black with posterior margin broadly piceous; elytra nearly uniformly irrorated with brown, vaguely paler laterally ........................................... *laccophilus* atristernalis Crotch

Metasternum, metacoxal plates and abdominal sterna yellow to testaceous; elytra irrorated with brown, but with definite clear yellow spots, the more constant ones located in a subbasal transverse series, a series in the apical three-fourths, a subapical transverse series, a median lateral and a postmedian sutural spot ........................................... *laccophilus* decipiens LeConte


Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: In California, et in Territorio Orgonensi abundat.


Type Repository: British Museum (Nat. Hist.), London.

Type Locality: California.

Utah Distribution: Box Elder, Davis, Tooele, Salt Lake, Juab, Utah, Wasatch, Millard, Washington, Kane, and San Juan Counties.

**Hydrovatus** Motschulsky 1855


Type Repository: British Museum (Nat. Hist.), London.
Type Locality: California.
Utah Distribution: Washington County, St. George (Chandler 1941).

_Bidessus_ Sharp 1882

1. Elytra with distinct sutural striae; elytra dark with pale post-humeral, post-medial and pre-apical color pattern
   _subtilis_ (LeConte)
   Elytra without sutural striae or at best very obscure; elytra dark with pale color pattern typically longitudinal or transverse

2. Elytra occasionally with obscure sutural striae; elytral markings of large transverse pale areas
   _amandus_ (LeConte)
   Elytra lacking sutural striae; elytral markings of longitudinal pale areas

_Bidessus affinis_ (Say), 1823, Trans. Amer. Phil. Soc., 2:24, 104.
   _nanus_ Aubé, _nigrinus_ Casey, var. _macularis_ LeConte, var. _obscurellus_ LeConte, var. _erythrostomus_ Mannerheim.
   Type Repository: Say's types are considered lost.
   Type Locality: Not stated by author.

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: “Sta Isabel,” California.

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Gila River, Arizona.
   Utah Distribution: Utah (Leech, 1948).

_Hygrotus_ Stephens 1828

1. Clypeus with marginal bead anteriorly
2. Clypeus lacking marginal bead anteriorly

2. Under surface black; male protarsal claws laminiform, anterior one a little shorter and less acute; elytra vittate; length 4-5 mm.
   _masculinus_ (Crotch)
   Under surface rufous or rufo-testaceous; male protarsal claws unmodified; disc of elytra with large, deep punctures.
   length less than 4 mm.
   _sayi_ Balfour-Browne

3. Last abdominal sternite of the male with a prominent oblique tumidity on either side, often obscure in female
   _tumidiventris_ (Fall)
   Last abdominal sternite without tumidity
4. Elytral punctation (excluding serial punctures) obviously dual in size; elytra flavo-to rufo-testaceous in color, generally with vitiform markings .................................................. 5

Elytral punctation (excluding serial punctures) not dual in size; elytral color highly variable, never vittate, generally with nebulose markings .................................................. 6

5. Elytral punctures coarse and intermixed with fine punctures between serial punctures; impressed lines of serial punctures variable in development; ventral surfaces shagreened; anterior protarsal claw simple .................................................. impressopunctatus (Schaller)

Elytral punctures fine, disparity evident but not as distinct as above, impressed lines of serial punctures lacking, ventral surface alutaceous; anterior protarsal claw short and stout .......................................................... unguicularis (Crotch)

6. Protarsi of male broadly dilated, nearly or quite as wide as the apical width of the tibia ........................................................................................................ patruelis (LeConte)

Protarsi of male at most only slightly dilated .................................................. 7

7. Color above testaceous with elytral cloud extending nearly to base; elytral markings highly variable sometimes almost absent .......................................................... medialis (LeConte)

Color above testaceous with a faint posterior elytral cloud .................................................. virgo (Fall)


Type Repository: Type is considered lost.

Type Locality: “Northwest Territory” (Wisconsin and Minnesota).


Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: San Diego.


Type Repository: American Museum of Natural History.

Type Locality: Virgin River, Utah.

Utah Distribution: Washington, Sevier, and Garfield Counties.

Hygrotrus patruelis (LeConte), 1855, Proc. Acad. Nat. Sci. 7:298. medialis Sharp, discoideus LeConte.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: Fort Laramie, “Nebraska” (Wyoming).

Utah Distribution: Cache, Summit, Daggett, Salt Lake, Utah, Wasatch, Duchesne, Uintah, Sanpete, Sevier, Garfield, and San Juan Counties.
Hygrotus tumidiventris (Fall), 1919, N. Am. Sp. Coelambus J. D. Sherman Jr. publ.; 16.
   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Stony Mountain, Manitoba.

   Type Repository: British Museum (Nat. Hist.), London.
   Type Locality: “Lake Labache” (Lac La Hache, British Columbia).
   Utah Distribution: Box Elder County, Muddy Reservoir, 17 miles west of Rosette and Utah County, Utah Lake.

   Type Repository: British Museum (Nat. Hist.), London.
   Type Locality: British Columbia.
   Utah Distribution: Daggett, Sanpete, Sevier, Beaver, Iron, Garfield, and Kane Counties.

Hygrotus impressopunctatus (Schaller), 1783, Abhandlungen der Hallischen Naturforschenden Gesellschaft. Dissau u. Leipzig., 312.
   Fabricius, flavicans Müller, lineatus Müller, ovalis Thunberg, punctatus Marsham, porosus Gebler, similis Kirby, alternatus Huryl, decemlineatus Mannerheim, picatus Kirby, alternans Kunze, lineelus Gyllenhal.
   Type Repository: Type is considered lost.
   Type Locality: Unknown to author.
   Utah Distribution: Box Elder, Davis, Salt Lake, Utah, Juab, Duchesne, Uintah, Sevier, Beaver, Piute, Wayne, Iron, and Garfield Counties.

Deronectes Shaper 1882

1. Elytral margin with small subapical tooth; outline of prothorax and elytra strongly discontinuous .......................................................... elegans (Panzer)

Elytral margin lacking subapical tooth; outline of prothorax and elytra continuous .......................................................... 2

2. Elytra with more than two distinct longitudinal, discal striae, the first no further from the sutural series than the sutural series is from the suture ................ striatellus (LeConte)

Elytra with only two longitudinal discal striae, often indistinct, the first twice as far from the sutural series as the sutural series is from the suture .......................... 3

3. Longitudinal elytral striae of impressed punctures distinct; form broader, less than twice as long as wide; body outline discontinuous; pronotal lateral marginal bead increasing in width posteriorly .................. aequinoctialis (Clark)

Longitudinal elytral striae of impressed punctures scarcely impressed; form narrower, twice as long as wide, continuous body outline; pronotal lateral marginal bead narrow but constant in width for entire length ........................................ 4
4. Color pattern of distinct, separate vittae, united only in two discal and three sublateral spots; smaller sized beetles ....

.................................................................................. coloradensis (Fall)

Color pattern of indistinct vittae with considerable transverse coalescence; larger sized beetles ... griseostriatus (DeGreer)

Type Repository: Type is considered lost.
Type Locality: Unknown to author.
Utah Distribution: Daggett County, Green River, and Salt Lake County. Mountain Dell Reservoir.

Type Locality: Sweden.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: San Francisco et San Diego, California.

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: Mexico.

Type Repository: Museum of Camparative Zoology, Harvard University, Cambridge, Massachusetts.
Utah Distribution: Cache. Summit, Duchesne Counties.

Hydroporus Clariville 1806

1. Posterior line of metacoxal processes sinuate to slightly angulate medially; meta-trochanters elongate. posterior margins more nearly in line with the posterior margin of the metafemora and approximately ⅓ the length of the metafemora; metacoxal processes glabrous .......................................................... 2

Posterior line of metacoxal processes truncate or very nearly so; meta-trochanters not elongate, posterior margins not in line with the posterior margin of the metafemora and only about ¼ the length of the metafemora; metacoxal processes with pubescence .......................................................... 3
2. Form subovate, width greater than twice the length, moderately convex; pronotum piceous to black; elytra yellowish-brown to reddish-brown ........................................... _vilis_ LeConte

Form narrower, width less than twice the length, more parallel sided, depressed; pronotum and elytra more nearly yellowish-brown to reddish-brown .................. _planiusculus_ Fall

3. Elytral punctures faint and minute; ovate beetles of larger size (4.5-6 mm. long) ............................................................... 4

Elytral punctures distinct and moderately coarse; oval beetles of smaller size (3.45 mm. long) ............................................. 7

4. Basal segments of male protarsi very large, wider than following segments ........................................... _notabilis_ LeConte

Basal segments of male protarsi no wider than the following segments ............................................ 5

5. Elytral punctures arranged in transversely elongate rows; fourth segment of protarsi of female reduced. third segment deeply bilobed ........................................... _transpunctatus_ Chandler

Elytral punctures in no distinct order; protarsi of female unmodified .................................................. 6

6. Abdominal sterna with dense, coarse punctures, most notable on last sternite; male anterior protarsal claws short, arcuate internally and bluntly pointed ........................................... _axillaris_ LeConte

Abdominal sterna with sparse, finer punctures, no notable difference on last sternite; male anterior protarsal claws short, sinuate internally and acuminate ........... ? _niger_ Say

7. Size moderate (3.5-4.5 mm.) ............................................................... 8

Size small (less than 3.5 mm.) ........................................................... 10

8. Third segment of male protarsi broadly dilated, slightly wider than first and second segments .......... _tenebrosus_ LeConte

Third segment of male protarsi narrowly dilated, never wider than first and second segments .................... 9

9. Anterior protarsal claws of male shorter than their fellows ........................................... _pervicinus_ Fall

Protarsal claws of male equal ........................................... _despectus_ Sharp

0. Ventral sclerites alutaceous or shagreened between punctures ........................................... _occidentalis_ Sharp

Ventral sclerites polished or shining between punctures ........................................... _fuscipennis_ Schaum

Type Repository: British Museum (Nat. Hist.). London.
Type Locality: “Lake Labache” (Lac La Hache, British Columbia).
Utah Distribution: Box Elder, Cache, Utah. Duchesne, Summit, and Uintah Counties.

Type Repository: Museum of Comparative Zoology, Harvard University. Cambridge, Massachusetts.
Type Locality: San Jose et San Diego.
Utah Distribution: Duchesne, Uintah, Washington, and San Juan Counties.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Mt. Adams, White Mountains, New Hampshire.
Utah Distribution: Duchesne and Garfield Counties.

*Hydroporus tenебrosus* LeConte, 1850, Agassiz Lake Superior, 4:215. *rusticus*
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Lake Superior.
Utah Distribution: Sevier County, 1 mi. N. of Fish Lake and 18 mi. above Salina Reservoir.

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: Canada.
Utah Distribution: Utah County, Provo and Goshen.

Type Repository: Zoological Museum of the Bavarian State, Munich, Germany.
Type Locality: Unknown to author.
Utah Distribution: Duchesne County, Farmers Lake Group.

*Hydroporus axillaris* LeConte, 1853, Cat. of the Desc. Col. of the U. S. by F. E. Melsheimer, revised by Haldeman and LeConte, :32. *humeralis* LeConte.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Colorado River.
Utah Distribution: Washington County, St. George.

Type Repository: Type is considered lost.
Type Locality: Not stated in original description.
Utah Distribution: Cache County, Canteen Springs, Logan Canyon.

*Hydroporus notabilis* LeConte, 1850, Agassiz Lake Superior, 4:216.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Black Bay. Lake Superior.
Utah Distribution: Box Elder. Salt Lake, and Utah Counties.

*Hydroporus pervicinus* Fall, 1923, Revision N. Am. Sp. *Hydroporus* and *Aga- porus*, 84.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Lake Tahoe, California.
Utah Distribution: Summit, Utah, Duchesne. Uintah, and Sanpete Counties.

Type Repository: Brigham Young University, Provo, Utah.
Type Locality: Salamander Lake (pond). Mt. Timpanogos, Utah County, Utah.
Utah Distribution: Cache and Utah Counties.
Oreodytes Seidlitz 1886

1. Epipleura not impressed at humeral angles for reception of mesofemora; metafemora strongly curved at attachment to trochanters; elytra of female with an angular tooth laterally near the apex; elytra lackly impressed longitudinal series of discal punctures; larger (over 4 mm. long) .................................................. semiclarus (Fall)
   Epipleura impressed at humeral angles for reception of mesofemora; metafemora not strongly curved at attachment to trochanters; elytra of female lacking angular tooth laterally near apex; elytra with impressed longitudinal series of discal punctures; smaller (less than 4 mm. long) ................................ 2

2. Body outline discontinuous, form elongate oval ............... 3
   Body outline continuous, form broadly oval .................... 4

3. Epipleura black or slightly paler along lateral margin; scattered punctures of elytra evident; discal series of punctures moderately impressed ......................... scitulus (LeConte)
   Epipleura pale or slightly darker along lateral margin; scattered punctures of elytra indistinct; discal series of punctures distinctly impressed .......... septentrionalis (Gyllenhal)

4. Metacoxal plates with scattered large punctures; scattered elytral punctures distinct ......................... crassulus (Fall)
   Metacoxal plates with scattered small punctures, scattered elytral punctures reduced or lacking ..................... 5

5. Elytra with faint, occasional punctures between discal and subhumeral longitudinally impressed series; elytra nigrolinate .............................................................. obsesus (LeConte)
   Elytra impunctate between discal and sub-humeral longitudinally impressed series; elytra indistinctly nigrolinate, considerable coalescence forming a transverse cloud .......................................................... congruus (LeConte)

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: California.
   Utah Distribution: Cache County, Logan.

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Florissant, Colorado, (8,000 ft.).
   Utah Distribution: Box Elder, Summit, Daggett, and Wasatch Counties.

   septentrionalis auct (nec Gylll.).
   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Eagle Harbor, Lake Superior.
   Utah Distribution: Weber County, Uintah on the Weber River.
  Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
  Type Locality: Georgetown, Colorado.
  Utah Distribution: Cache County, Logan.

Orcodytes crassulus (Fall), 1923, Revision N. Am. Sp. Hydroporus and Agaporus:119.
  Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
  Type Locality: Western Montana.

Orcodytes septentrionalis (Gyllenhal), 1827. Insecta Suecica, 4:385.
  Type Repository: Zoological Museum, Uppsala, Sweden.
  Type Locality: Unknown to author.
  Utah Distribution: Duchesne County, Miners Gulch on Rock Creek.

Agabinus Crotch 1873

  Type Repository: Zoological Museum, University of Moscow, Russia.
  Type Locality: California.
  Utah Distribution: Washington County, St. George, and Zion National Park.

Agabus Leach 1817

1. Antennal segment 7 to 11 of male dilated, segments 8 to 10 broader than long; metasternal wings very narrow, elongate and tongue like ........................................... antennatus Leech
   Antennal segments of male not dilated; segments never broader than long; metasternal wings broad or narrow, never elongate or tongue like ........................................... 2

2. Outline of body clearly discontinuous; pronotum subcordate .. 3
   Outline of body not or very slightly discontinuous; posterior margin of pronotum wider than the middle of the pronotum ................................................................. 4

3. Posterior margin of pronotum 6/7 as wide as base of elytra; lateral margin of pronotum slightly sinuate; black; appendages obscurely rufous; 9-10.8 mm. in length .............
   Posterior margin of pronotum 9/10 as wide as base of elytra; lateral margin of pronotum subparallel before curving out strongly; piceous to rufous; feebly aenescent; 8.7-9.2 mm. in length ................................................... cordatus (LeConte)

4. Elytra testaceous with four black vittae often more or less confluent so that elytra are almost black; meshes of elytral reticulations small, unequal ........... disintegritus (Crotch)
   Elytra color various, never vittate; meshes of elytral reticulations various ........................................... 5
5. Spinous punctures along posterior margin of lower surface of metatibiae so closely set as to form an almost continuous groove from base nearly to apex ........................................ 6
Spinous punctures along posterior margin of lower surface of metatibiae well separated or lacking except in basal 1/3. .... 7

6. Male anterior protarsal claw with basal tooth; elytra coarsely reticulate, alveoli large; metafemora strongly obliquely strigate .................................................. *tristis* Aubé
Male anterior protarsal claw not toothed, slightly sinuate or dilated medially along inner margin; elytra finely reticulate; strongly convex when viewed laterally .................................................. *minnesotensis* Wallis

7. Prosternal process rather broad, slightly convex, never with a median carina .......................... 8
Prosternal process narrower, moderately convex to acutely longitudinally carinate .................................................. 11

8. Prosternal process broad and flat, sides broadly margined behind the procoxal cavity; protarsi with only small apical area of basal joint clothed with small pallettes, metatibiae without row of spinous punctures .... *semivittatus* LeConte
Prosternal process broad, slightly convex, never broadly margined behind procoxal cavities, protarsi variable, metatibiae with a row of spinous punctures along posterior lower margin .................................................. 9

9. Fine punctures of elytra occurring at intersections of the reticulations; pronotal bead very narrow; prosternal process bluntly pointed .......... *hypomelas hypomelas* Mannerheim
Fine punctures of elytra occurring within meshes of reticulations; pronotal bead moderately wide; prosternal process sharply pointed .................................................. 10

10. Metasternal wings narrow, least distance from mesocoxae to metacoxal plate less than 1/2 width of the latter; elytral reticulations lightly impressed; elytra unicolor ............. .................................................. *seriatus intersectus* (Crotch)
Metasternal wings broad, least distance from mesocoxae to metacoxal plate more than 1/2 the width of the latter; reticulations more deeply impressed; elytra generally with small sublateral yellow spot behing middle .................................................. *lugens* LeConte

11. Elytral reticulations forming large meshes in both sexes, deeply impressed ........................................ 12
Elytral reticulations forming small meshes in male; slightly coarser in females of some species ........................................ 13

12. Head, pronotum and elytra reddish-brown, ventral surface blackish; prosternal process without pubescence; epipleura pale .................................................. *austini* Sharp
Head and pronotum black, elytra fuscous often paler at humeral angle; prosternal process finely pubescent; epipleura dark
13. Anterior protarsal claws of male toothed medi ally or sub-apically along inner margin, posterior claw short and curved
Anterior protarsal claws of male not toothed, posterior claw long and slender, only slightly curved
14. Anterior protarsal claws of male subapically toothed, appearing bifid; male pro-and mesotarsi broad, glandular hairs forming pallettes; size over 7 mm. length
Anterior protarsal claws of male toothed near apex, not bifid; male pro- and mesotarsi narrowed, glandular hairs not forming pallettes; surface distinctly aeneous; size less than 7 mm. length
15. Glandular hairs of male protarsal and mesotarsal pads fine not dilated apically
Glandular hairs of male protarsal and mesotarsal pads, at least of third segment, enlarged into pallettes
16. Pronotal bead wide; metacoxal wing narrow. least distance from mesocoxal to metacoxal plate less than 1/2 the width of the latter; size less than 6.5 mm. long
Pronotal bead narrow, metacoxal wing wide. least distance from mesocoxal to metacoxal plate more than 1/2 the width of the latter; size larger than 6.5 mm. long
17. Anterior protarsi of male feebly dilated; 3rd segment scarcely wider than 4th
Anterior protarsi of male rather strongly dilated; 3rd segment wider than 4th
18. Prosternal process narrow, lanceolate carina of prosternum continuing into prosternal process but not pronounced
Prosternal process broad, acutely carinate
19. Meshes of elytral reticulation very small, rounded and sub-equal; male protarsal claw-bearing segment dentate beneath
Meshes of elytral reticulation larger, irregular and unequal, showing secondary reticulations; male protarsal claw-bearing segment not dentate beneath
20. Protarsi and mesotarsi of male with extremely large circular pallettes; anterior angles of pronotum normal; metasternal groove prominent
Protarsi and mesotarsi of male with small though distinct pallettes; anterior angles of pronotum turned outward, away
from head; metasternal groove rudimentary .................. erichsoni G. & H.

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Santa Fe, New Mexico.

   Type Repository: University of Washington, Seattle, Washington.
   Type Locality: Vancouver Island, British Columbia.
   Utah Distribution: Tooele County, Ibapah Pass.

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: Colorado desert of California.
   Utah Distribution: San Juan, Kane, and Washington Counties.

   Type Repository: Zoological Museum, Helsingfors, Finland.
   Type Locality: "Habitat in insula Sitkha D. Eschscholtz" (Alaska).
   Utah Distribution: Summit County, Diamond Lake (Chandler 1941).

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: California (lectotype designated by Leech 1942).

   Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
   Type Locality: San Diego, California. (Colorado desert of California also listed).

   Type Repository: Institut des Sciences Naturelles, Brussels, Belgium.
   Type Locality: "L’Amerique du Nord."
   Utah Distribution: Daggett and Cache Counties (Chandler 1941).

   Type Repository: Original series in British Museum (Nat. Hist.), London.
   Type Locality: Not designated by author, original distribution given as Kansas, Arizona, Pennsylvania, Nebraska, and Canada.
Type Repository: British Museum (Nat. Hist.), London.
Type Locality: British Columbia.

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: Lake Tahoe, California.

Agabus griseipennis LeConte, 1859, Smithsonian Contrib. Knowledge, 11:5.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Fort Laramie, Wyoming.
Utah Distribution: Weber, Salt Lake, Daggett, Utah, Sanpete, Grand, Kane, and San Juan Counties.

Agabus obliteratus LeConte, 1859, Smithsonian Contrib. Knowledge, 11:5.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Fort Laramie, Wyoming.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Horsefly Pk. Divide, Placerville Rd., San Miguel County, Colorado.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Waghrorn, Alberta, Canada.
Utah Distribution: Duchesne County, Farmers Lake Group; Garfield County, Cyclone Lake and Beaver County, Tushar Mts.

scapularis Mann.
Type Repository: Zoological Museum, Helsingfors, Finland.
Type Locality: Sitka, Alaska.
Utah Distribution: Reported by Leech - "Utah" (1938).

Agabus erichsoni Gemminger and Harold, 1868, Cat. Coleopt., 2:454. nigro-aeneus Erickson, 1873, (nec Marsham, 1802).
Type Repository: Zoological Museum of Humboldt University, Berlin, Germany.
Type Locality: Berlin, Brandenburg, Germany.
Utah Distribution: Summit County, Trial Lake and Duchesne County, Mirror Lake.

Type Repository: Musée Royal des Sciences Naturellas, Brussels, Belgium.
Type Locality: "L'Amerique septentrionale" (North America).

Type Repository: Loup Fork of the Platte River, Nebraska.
Type Locality: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Utah Distribution: Garfield County (Beck, 1954).

Agabus verisimilis Brown, 1932, Canad. Entomol. 64:4, 5.
Type Repository: University of Minnesota.
Type Locality: Minnesota, Hennepin County (apparently an erroneous locality label).
Utah Distribution: Washington County (Tanner 1939).

Agabus kenaiensis Fall, 1926, Pan-Pacific Ent., 2:141, 142.
Type Repository: University of Minnesota.
Type Locality: Anchorage, Alaska.
Utah Distribution: Summit County (Chandler 1941).

Ilybius Erichson 1832

1. Metatarsi of male not margined externally above; large setiferous punctures on ventral surface of metatibiae confined to anterior and posterior margin, sometimes with a few at base ........................................... fraterculus (LeConte)
Metatarsi of male margined externally above; metatibiae with strong setiferous punctures over most of their under surface ........................................... 2

2. Last Sternite of male with an acute median carina, strigate laterally; metasternal wings narrow, mesocoxae and metacoxal plates separated by more than 1/3 the width of the latter, measured along the same line; secondary elytral reticulation present ...................................... angustior (Gyllenhal)
Last sternite of male lacking carina; strigate at sides in both sexes; metasternal wings broad; mesocoxae and metacoxal plates separated by about 1/3 the width of the latter, measured along the same line; secondary elytral reticulations lacking ........................................... subaeneus Erichson

Ilybius subaeneus Erichson, 1839, Die Kafer Mark Brandenberg, 1 (vol. 1):156.
viridiaeneus Crotch.
Type Repository: Zoological Museum of Humboldt University, Berlin, Germany.
Type Locality: Berlin, Brandenburg, Germany.
Utah Distribution: Daggett, Summit, and Duchesne Counties.

Ilybius angustior (Gyllenhal), 1808, Ins. Suecica. 1:500, picipes Kirby.
Type Repository: Zoological Museum, Uppsala, Sweden.
Type Locality: Unknown to author.
Utah Distribution: Summit, Duchesne, and Garfield Counties.

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: North Red River.

_Coptotonus_ Say 1834

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Laramie, “Territorio Missouriens” (Wyoming).
Utah Distribution: Cache County, Logan and Daggett County. Green River.

_Rhantus_ Dejean 1833

1. Pronotal disc with single transverse spot, not bilobed; metacoxal processes pale; prosternum pale: male anterior protarsal claws long, sinuate, dilated; posterior protarsal claws 5/9 length of anterior claws ................ .. _fronalis_ (Marsham)
   Pronotal disc bimaculate or with single bilobed spot; only posterior tips of metacoxal processes pale, if at all: male anterior protarsal claws long or short, sinuate or straight not dilated, posterior protarsal claws almost as long as anterior claws ................................................................. 2

2. Anterior protarsal claws 1/3 longer than fellows and longer than claw bearing segment; female with elongate-oval roughened area on each elytron; prosternal process (carina) usually black ......................... _anisonychus_ Crotch
   Anterior protarsal claws only slightly longer than fellows, not as long as claw bearing segment; female without roughened area on elytron; prosternal process (carina) usually pale ................................................................. 3

3. Elytra solid black except for yellowish-brown irrorate apex, lateral, basal and scutellar margin .... _mexicanus_ (Laporte)
   Elytra yellowish, irrorated with black ............................. 4

4. Anterior and posterior protarsal claws of male straight, sinuate along inner margin ................ _binotatus_ (Harris)
   Anterior protarsal claws of male evenly, slightly curved, posterior claws arcuate ........................ 5

5. Anterior protarsal claws of male not broader at middle than at base; aedeagus with apical quarter thicker, less strongly twisted to one side; elytral reticulations deeply impressed, elongated slightly longitudinally ........... _gutticollis_ (Say)
Anterior protarsal claws of male broader at middle than at base, strongly arcuate; aedeagus with apical quarter thinner, more strongly twisted to one side; black dots of elytra vermiciform, elytral reticulations lightly impressed .......... hoppingi Wallis


Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: Not stated by author; original distribution given as Mexico, Guatemala, and Western United States.


Type Repository: Type is considered lost.

Type Locality: “River beyond Vera Cruz.”


Type Repository: Type is considered lost.

Type Locality: Mexico.

Utah Distributions: Emery, Garfield, and Grand Counties.


Type Repository: Canadian National Collection, Ottawa, Canada.

Type Locality: Trinity Valley, B. C.

Utah Distribution: Box Elder, Weber, Summit, Salt Lake, and Utah Counties.


Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: Not stated in original description. Leech (1948) remarks that Darlington, of the Museum of Comparative Zoology at Harvard University, feels that Crotch’s probable type in the LeConte collection is labeled S. Fr. standing probably for San Francisco.

Utah Distribution: Washington County (Tanner 1934).


Type Repository: Type is considered lost.

Type Locality: Unknown to author.

Utah Distribution: Daggett County; Garfield County, Aquarius Plateau and Sevier County, 1 Mile North of Fish Lake, and 1 Mile North of Jct. Hwy. 24 on Hwy. 25.

**Colymbetes** Clairville 1806


Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Type Locality: Ipswich, Massachusetts.

Dytiscus Linnaeus 1758

1. Metacoxal processes bluntly pointed apically; adhesive pads on 2nd and 3rd mesotarsal segments of male longitudinally divided by a bare space; elytra of male and female smooth ............................................. marginicollis LeConte

2. Dorsum of head adjacent to eye yellow along inner margin; size larger, over 30 mm. long ........................... dauricus Gebler

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: “In Flumine Missouri” (Missouri River).
Utah Distribution: Cache, Salt Lake, Summit, Daggett, Utah, and Sanpete Counties.

confluens Say, diffinis LeConte.
Type Repository: Unknown to the author.
Type Locality: Unknown to the author.

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: Great Bear Lake River.
Utah Distribution: Summit County. Lilly Lake and Duchesne County, Rock Sea Pass.

Hydaticus Leach 1817

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: Not mentioned by author, but distribution given as North America. Utah Distribution: Salt Lake and Juab Counties.

Acilius Leach 1817

Type Repository: Musée Royal des Sciences Naturelles, Brussels, Belgium.
Type Locality: “Habitat in insula Sitkha” (Alaska).
Utah Distribution: Box Elder, Weber, Summit, Salt Lake, Utah, Wasatch, Duchesne, Sanpete, Beaver, and San Juan Counties.

Therrnonectus Dejean 1833

1. Elytra black, conspicuously marked with numerous yellow spots, considerable coalescence may be observed with the pale lateral margins .......................... marmoratus (Hope)
Elytra black, lateral margins with variable yellow vitta, may be interrupted ........................................ basillaris (Harris)

Thermonecetus basillaris (Harris), 1829, New England Farmer, 8:1, incisus Aubé, cinctatus Aubé, laticinctus LeConte, nimbutus Melsheimer.
Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: Not given by original author.
Utah Distribution: Salt Lake, Weber, Tooele, Utah, and Juab Counties.

Thermonecetus marmoratus (Hope), 1832, in: Cuvier, Animal Kingdom, 1:284, and pl. 32, fig. 1. flavomaculatus Chevrolat, maculatus LeConte.
Type Repository: Paris Museum (Nat. Hist.)
Type Locality: Mexico.
Utah Distribution: Grand, Garfield, Kane, and San Juan Counties.

Graphoderus Dejean 1833

1. Pronotum with transverse anterior and posterior fascia attaining margins; male protarsi dilated, clothed beneath with 14 or 15 pallettes; male mesotarsi not dilated and without pallettes .................................................. occidentalis Horn
Pronotum with transverse anterior and posterior fascia not attaining margins; male protarsi dilated, clothed beneath with three large and numerous smaller pallettes; male mesotarsi with pallettes .................................. perplexus Sharp

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: United States.
Utah Distribution: Wasatch County, 3 mi. East of Guardsman’s Pass; Garfield County, Aquarius Plateau.

Type Repository: Academy of Sciences, Philadelphia, Pennsylvania.
Type Locality: No type was designated, but California and Washington territory were listed as the distribution in the original description.
Utah Distribution: Salt Lake, Duchesne, and Grand Counties.

Eretes Laporte 1833

Type Repository: British Museum (Nat. Hist.), London.
Type Locality: “Barbarie.”
Utah Distribution: Box Elder County, Muddy Reservoir, 17 mi. West of Rosette; Washington County, St. George.

Cybister Curtis 1827

Type Repository: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Type Locality: “Ad San Diego,” Colorado, et Sacramento minus frequens, given as original distribution.
Utah Distribution: Salt Lake, Tooele, Utah, and Washington Counties.
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Literature Cited


