

# Key to the carrion beetles (Silphidae) of Colorado & neighboring states

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Version 3: posted online December 2021

This key is based on several identification sources, including Anderson & Peck 1985, De Jong 2011, Hanley & Cuthrell 2008, Peck & Kaulbars 1997, Peck & Miller 1993, and Ratcliffe 1996. We include all species known from Colorado and those in the surrounding states that might occur in Colorado. Of course, new species may be detected in the state, so make sure to investigate unique individuals carefully. We have included pictures of each species from specimens of the Entomology collection at the CU Museum of Natural History (UCM), the Colorado State C.P. Gillette Museum of Arthropod Diversity (GMAD), and the Florida State Collection of Arthropods (FSCA). A glossary of terms, a list of the regional states where each species has been detected, and references can be found after the key. We would appreciate reports of omitted species or species from new localities not stated herein. **First step—ID as a silphid:** Large size, body shape, and antennal club are usually distinctive. Body usually 10-35 mm, moderately to strongly flattened. Elytra broad toward rear, either loosely covering abdomen or short, exposing 1-3 segments. Antennae often ending in a hairy, three-segmented club, usually preceded by two or three enlarged but glabrous segments (subfamily Silphinae) or antennomeres 9-11 lammellate (subfamily Microphorinae). Black, often with red, yellow, or orange markings. Five tarsal segments on each leg (White 1983, Peck 2001).

## 1.

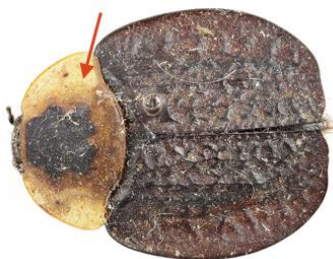
- a. Elytra mostly uniform brown or black... 2
- b. Elytra brown or black with red, yellow, or orange markings ranging from small dots to large bands (coloration best viewed under bright light)... 12

## 2(1).

- a. Pronotal disc with single large black or dark brown macula bordered by yellow or tan coloration... 3
- b. Pronotum uniformly colored, lacking tan or yellow coloration around black or dark brown central macula... 4

## 3(2).

- a. Width of pronotal macula at base <50% width of entire pronotal base. Elytra rugose... ***Necrophila americana*** [not known in CO; similar-looking *Oxelytrum discicollis* may be in S TX: non-rugose elytral intervals and pointed elytral apices]
- b. Width of pronotal macula at base >80% width of entire pronotal base. Macula forming rounded lobes posteriorly. Elytra not rugose... ***Oiceoptoma noveboracense***



3a. Dorsal view of *Necrophila americana* (GMAD)



3b. Dorsal view of *Oiceoptoma noveboracense* (UCM # 0196997)

4(2).

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- a. Elytral apex truncate. Elytra without costae (costae=rounded ridges; see red arrow below)... 5
- b. Elytral apex various. Elytra with costae... 6



5(4).

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- a. Pronotum smooth and domed; no costae on elytra. Black antennal clubs... ***Thanatophilus truncatus***
- b. Pronotum not smooth; has a transverse impression. Orange antennal clubs and brown metasternal pubescence... ***Nicrophorus nigrita*** [CA populations known to have orange maculations on epipleuron]  
(note: that some other *Nicrophorus* species can be melanistic in West Coast, SW populations (i.e., *N. guttula*; *N. defodiens*; *N. investigator*; check for pubescence color & faint orange spots on elytra, etc.)



5a. Dorsal view of *Thanatophilus truncatus*  
(UCM # 0196992)



5b. Dorsal view of *Nicrophorus nigrita*  
(GMAD)

6(4).

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- a. Pronotum densely covered with light brown or golden setae (hairs) interspersed with black triangular or inverted teardrop shaped patterns. Elytra with rows of tubercles between costae along length of elytra...  
***Thanatophilus lapponicus***
- b. Pronotum and elytra without the above characters... 7

6a. Dorsal view of  
*Thanatophilus lapponicus*  
(UCM # 0196998)



7(6).

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- a. Elytra with raised dendritic network branching from costae... ***Heterosilpha ramosa***\*  
\*[*Heterosilpha aenescens* (CA, OR) similar dendritic patterning, but without dense ventral pubescence, sometimes with metallic shiny elytra]

- b. Elytra without dendritic patterning... 8



7a. Dorsal view of  
*Heterosilpha ramosa*  
(UCM # 0196994)

8(7).

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- a. Elytral costae one and two [counting medially (i.e., from inner edge)] range from nonexistent to very weakly developed along length of elytra, often becoming more prominent between tubercle and elytral apex. Elytral costae three prominent along entire length. Dorsum and head covered in fine black setae, orange tipped at end of abdominal segments... ***Thanatophilus coloradensis*** [alpine tundra specialist in Rockies]

- b. Elytral costae one through three clearly developed along entire length.  
Setae on head various... 9



8a. Dorsal view of  
*Thanatophilus coloradensis*  
(UCM # 0091547)

9(8).

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- a. Long, erect, pointed hairs behind eyes that resemble eyelashes. A small triangular point at shoulder of elytra (elytral tooth)... 10

- b. No hairs or short, not distinctly erect hairs behind eyes. Elytral shoulder without elytral tooth... 11



9a. Long, erect  
hairs behind eye  
of *Oiceoptoma*  
*inaequale*  
(GMAD)



9b. Elytral tooth  
of *Oiceoptoma*  
*noveboracense*  
(UCM # 0249254)



10(9).

- a. Elytral epipleuron wide for over half its length, then tapers to a narrow posterior end, whereas the underside elytral-portion of the epipleuron wider posteriorly and overhanging like a distinct shelf. Elytral intervals smooth.... ***Oiceoptoma inaequale*** (see red dotted line for lower and upper parts of epipleuron)
- b. Elytral epipleuron mostly uniformly narrow for entire length with the underside elytral-portion narrow, not distinctively overhanging, but more one triangular piece throughout its length. Elytral intervals often with transverse rugose sculpting (e.g., wavy pattern) esp. posterior edges of elytra.... ***Oiceoptoma rugulosum***



10a. Wide elytral epipleuron (arrow) and dorsal view of *Oiceoptoma inaequale* (GMAD)



10b. Narrow elytral epipleuron (arrow) and dorsal view of *Oiceoptoma rugulosum* (FSCA)



Note: these two species can be challenging to distinguish. Neither known in Colorado.

11(9).

- a. Labrum narrow and deeply notched; mesocoxae narrowly separated. Pronotum with small smooth glossy areas... ***Aclypea bituberosa***  
[*Aclypea opaca*: AK, N Canada; similar but w/ shallow, more widely spaced punctures on elytra, thinly sclerotized genitalia]
- b. Labrum broad and more shallowly notched; mesocoxae widely separated. Pronotum without smooth glossy areas... ***Thanatophilus sagax*** [*T. trituberculatus*: AK, Canada, similar but with outer costa terminating at apical callus (bump)]

11a. Narrow, deeply notched labrum and dorsal view of *Aclypea bituberosa* (GMAD)



11b. Broad, shallow labrum and dorsal view of *Thanatophilus sagax* (GMAD)



12(1).

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- a. Elytra distinctly costate with yellow, orange, or reddish dots or band near elytral apex only. Elytra tuberculate anterior to colored marking; elytra densely punctate... ***Necrodes surinamensis***
- b. Elytra without distinct costae or tubercles; dots or banding patterns various; elytra weakly punctate... 13



12a-1. Dorsal view of *Necrodes surinamensis* (GMAD)



12a-2. Densely punctate elytra of *Necrodes surinamensis* (GMAD)



12b. Weakly punctate elytra of *Nicrophorus carolinus* (UCM # 0091350)

13(12).

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- a. Pronotum smoothly domed without anterior transverse impression, lateral margins extremely narrow. Elytral epipleuron narrow w/ orange antennal clubs... ***Nicrophorus carolina***
- b. Pronotum with anterior transverse impression or with dense yellow hairs, lateral margins not narrow. Elytral epipleuron wide (see image 10a), antennal clubs various... 14



13a. Narrow epipleuron and dorsal view of *Nicrophorus carolina* (UCM # 0091350)



13b. Pronotum of *Nicrophorus investigator* showing anterior transverse impression (UCM # 0196989)





14(13).

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- a. Frons and pronotal disc red or orange. Each tarsal empodium with four hairs between the two claws...

***Nicrophorus americanus***

[Endangered. Not known from Colorado. If found alive, please photograph frons and pronotal disc, release to original collection site; upload images to bugguide.net: date and locality recorded publicly]

- b. Frons and pronotal disc black. Each tarsal empodium with two hairs between the two claws... 15



14a. Dorsal view of *Nicrophorus americanus* —note orange frons and pronotal disc

(<http://rcngrants.org/content/development-online-database-enhance-conservation-sgcn-invertebrates-northeastern-region>)

15(14).

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- a. Pronotum with dense yellow pubescence... ***Nicrophorus tomentosus*** [black antennal clubs, orange epipleuron with anterior end black; sometimes pronotum pubescence substantially rubbed off]

- b. Pronotum glabrous or with sparse hair on anterior or lateral margins... 16



15a. Dorsal view of *Nicrophorus tomentosus* (UCM # 0196999)

16(15).

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- a. Posterior lobe of metepimeron with dense yellow pubescence; pronotum cordate (heart-shaped)... 17

- b. Posterior lobe of metepimeron glabrous, or with dark hairs; pronotum variable... 19



16a. Metepimeron of *Nicrophorus marginatus* covered with dense yellow pubescence (UCM # 0196991)

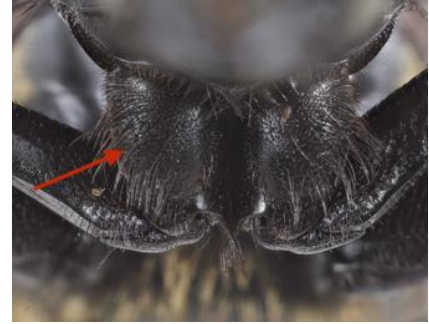


16b. Glabrous metepimeron of *Nicrophorus sayi* (GMAD)

17(16).

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- a. Anterior face of procoxa with short hairs on basal half... *Nicrophorus marginatus* [orange antennal clubs, orange epipleuron; orange spots in elytra connected on lateral margin]
- b. Anterior face of procoxa with long hairs on basal half... 18



17a. Short hairs on basal half of procoxa and dorsal view of *Nicrophorus marginatus* (UCM # 0196991)

17b. Long hairs on basal half of procoxa of *Nicrophorus guttula* (UCM # 0196986)

18(17).

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- a. Penultimate antennal segment with outer edge deeply emarginate (deep V-shaped). Basal segment of antennal club black. Elytron with anterior black band reaching epipleural ridge but not crossing onto epipleuron... *Nicrophorus obscurus*
- b. Penultimate antennal segment with outer edge shallowly emarginate (U-shaped). Basal segment of antennal club black or orange; if orange, elytron with anterior black band crossing onto epipleuron; if black, elytral macula reduced or absent... *Nicrophorus guttula* [for melanistic form, see ventral yellow pubescence]



18a. Deeply emarginate antennal segment and dorsal view of *Nicrophorus obscurus* (UCM # 0196987)



18b. Shallowly emarginate antennal segment and dorsal view of *Nicrophorus guttula* (UCM # 0196986)



19(16).

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- a. Metatibia curved. Anterior black band of elytron not reaching epipleuron; posterior red spot not reaching epipleuron... ***Nicrophorus sayi*** [orange antennal clubs, orange epipleuron; not known from Colorado]
- b. Metatibia straight. Anterior black band of elytron usually reaching epipleuron... 20



19a. Curved metatibia and dorsal view of *Nicrophorus sayi* (GMAD)



19b. Straight metatibia of *Nicrophorus nigrita* (GMAD)



20(19).

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- a. Elytral epipleuron unicolored black or orange... 21
- b. Elytral epipleuron bicolored, black and orange... 24

21(20).

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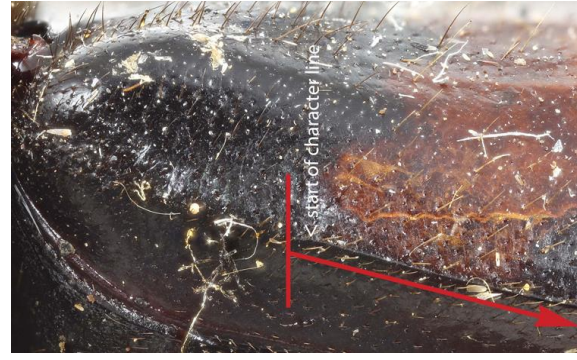
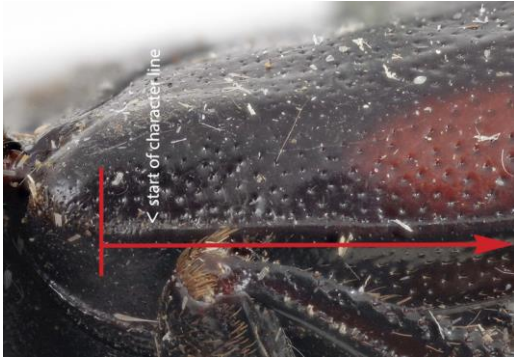
- a. Elytral epipleuron dark brown or black (similar color to non-spotted parts of elytra)... 22
- b. Elytral epipleuron orange (similar color to spots on elytra)... 23

22(21).

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- a. One small anterolateral spot and two small posterior spots. Dorsal surface of elytron without long, fine hair. Epipleural ridge long, anterior end reaching almost to level of anterior portion of scutellum... ***Nicrophorus pustulatus*** [not known in Colorado]
- b. Orange spots larger and more numerous. Dorsal surface of elytron with long, fine hair. Epipleural ridge short, anterior end reaching only to level of posterior tip of scutellum... ***Nicrophorus orbicollis***





22a. Long epipleural ridge (red vertical line = anterior of ridge; red horizontal line & arrow parallels ridge posteriorly) and dorsal view of *Nicrophorus pustulatus*. Note lack of elytral hairs (GMAD)



22b. Short epipleural ridge (red line & arrow; see 22a) and dorsal view of *Nicrophorus orbicollis*. Note elytral hair at top of image (GMAD)

23(21).

- a. Elytron with continuous multiple and irregular rows of stout, erect hairs around shoulder to anterior end of epipleural ridge. Metasternum with elongate bald patch immediately posterior to each mesocoxa... ***Nicrophorus hybridus*** [relatively rare species in CO; can be challenging to distinguish from *N. investigator*]
- b. Elytron with continuous multiple and irregular rows of hairs around shoulder but ending well before anterior end of epipleural ridge. Metasternum without bald patches immediately posterior to each mesocoxa... ***Nicrophorus investigator***



23a-1. Hairs around shoulder to base of epipleural ridge and dorsal view of *Nicrophorus hybridus* (UCM # 0196988)



23a-2. Dorsal view of *Nicrophorus hybridus* (UCM # 0196988)



23b-1. Hairs around shoulder ending before epipleural ridge and dorsal view of *Nicrophorus investigator* (UCM # 0196989)



23b-2. Dorsal view of *Nicrophorus investigator* (UCM # 0196989)

24(20).

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- a. Metasternal pubescence brown, sparse; apical three segments of antennal club red... ***Nicrophorus mexicanus***
- b. Metasternal pubescence yellow, dense; apical three segments of antennal club black... 25

24a. Dorsal view of  
***Nicrophorus mexicanus***  
(UCM # 0196996)



25(24).

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- a. Anterior portion of elytral epipleuron orange with black spot. Upper and lower faces of ninth and tenth antennal segments each with patch of dense, white hairs arranged in a radial “figure eight” pattern... ***Nicrophorus vespilloides*** [unlikely to occur in CO or surrounding states; see Table below]
- b. Anterior portion of elytral epipleuron entirely black. Upper and lower faces of ninth and tenth antennal segments without dense, white hairs, though vestige of the “figure eight” pattern may be present... ***Nicrophorus defodiens***



25a. Dorsal view of ***Nicrophorus vespilloides***  
(<http://www.thewcg.org.uk/silphidae/0237G.htm>)



25b. Dorsal view of ***Nicrophorus defodiens*** (UCM # 0196986)

**Glossary:** (figures modified from Ratcliffe 1996; for terms not included in this glossary see Ratcliffe 1996)

**Antennal club** apical tip of the antenna that is enlarged into a club shape

**Apex of elytra** posterior or apical end of elytra

**Costa/Costae** ridge/ridges with a rounded crest

**Cordate** heart-shaped

**Coxa** first (most basal) segment of the leg

**Dendritic** branching form

**Elytra** hardened forewings

**Emarginate** notched along the border

**Empodium** lobe or spine between the two claws at the end of the tarsus (the final segment of insect leg)

**Epimeron** main posterior sclerite of the thoracic pleura

**Epipleural ridge** ridge along the lateral edge of each elytron; demarcates the dorsal border of epipleuron

**Epipleuron** lateral or ventrolateral flange of elytra

**Frons** sclerite forming the top of head

**Glabrous** smooth; without hairs

**Labrum** upper lip of mouth anterior to the clypeus

**Lamellate** plate-like, referring usually to antennal segments

**Macula or Maculations** spots

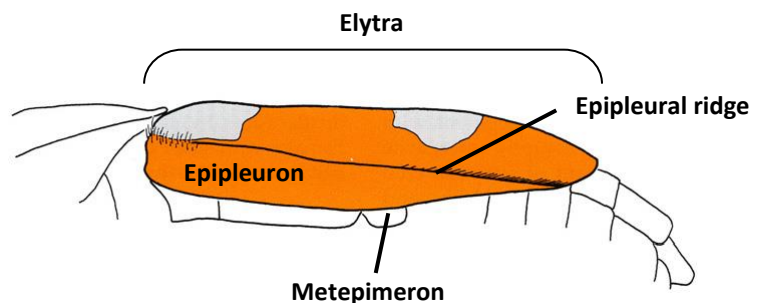
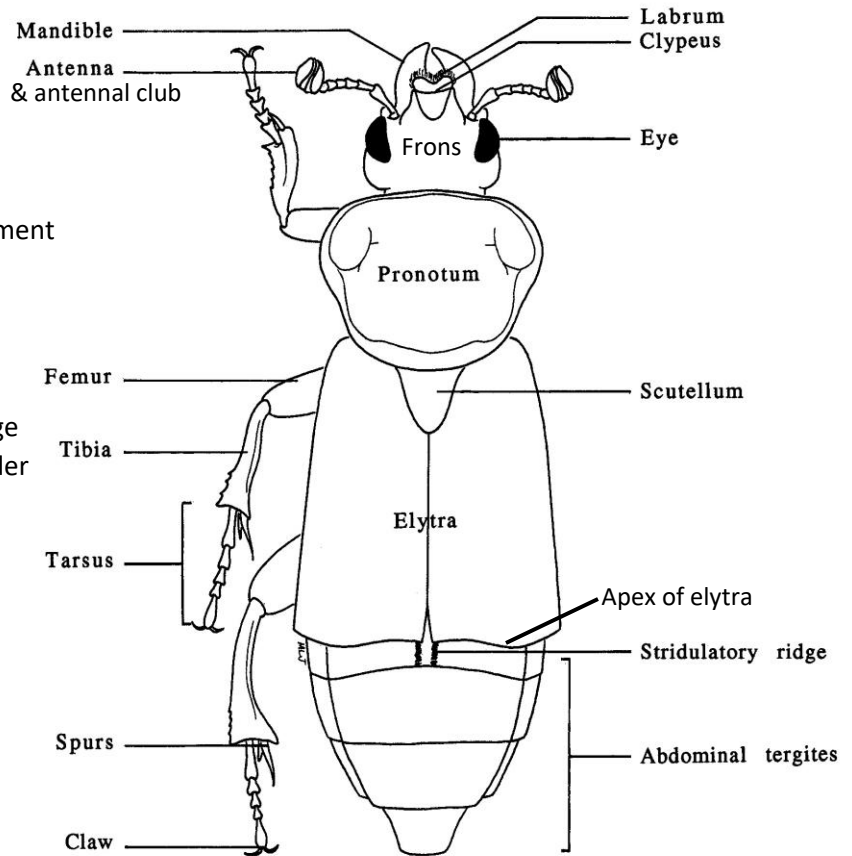
**Metepimeron** epimeron of third thoracic segment

**Meta-** belonging to third (hind) thoracic segment

**Meso-** belonging to second (middle) thoracic segment

**Notum** dorsal portion of each thoracic segment

**Penultimate** before last





**Pro-** belonging to first (fore) thoracic segment

**Pronotal disc** center of pronotum

**Pronotum** a prominent plate-like sclerite that covers the dorsal surface of the first thoracic segment

**Punctate** with punctures or small holes

**Rugose** wrinkled or with wavy ridges

**Sclerite** sclerotized (hardened) plate in exoskeleton or integument

**Scutellum** triangular sclerite between the pronotum and elytra

**Setae** hairs

**Setose** covered in setae (hairs)

**Sternum** a sclerite on the ventral side of the body

**Tarsus/Tarsi** the terminal segment(s) on the leg of an insect

**Tibia** fourth segment of the leg

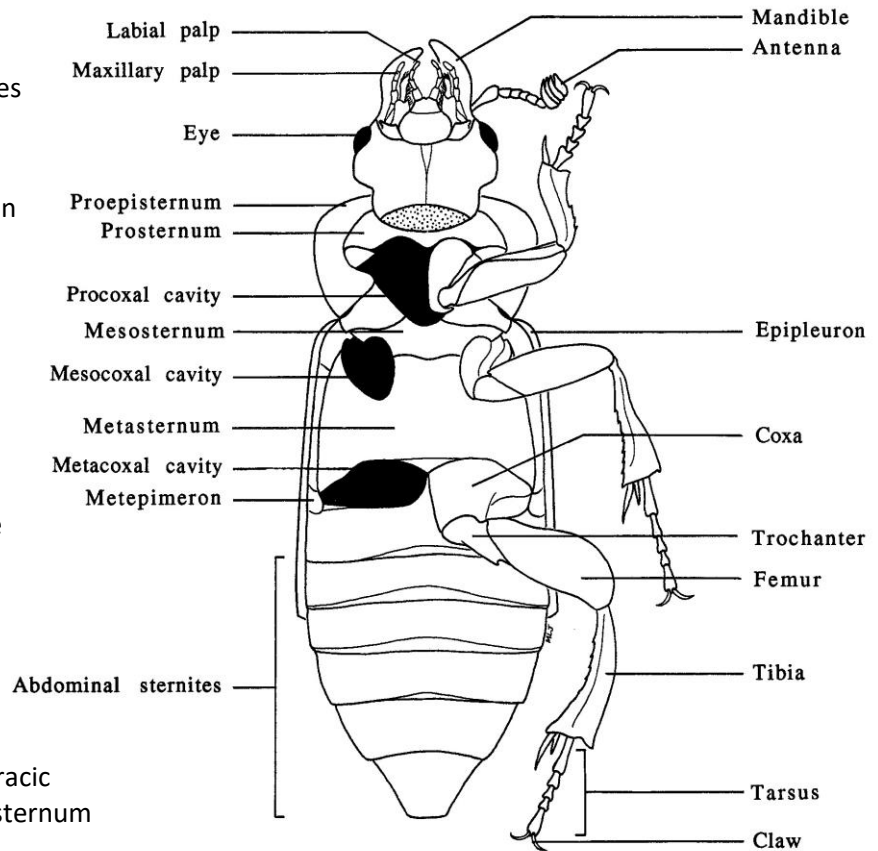
**Thoracic pleura** sclerites on each thoracic segment located above each thoracic sternum

**Transverse impression** horizontal inward fold across pronotum

**Truncate** cut off squarely

**Tubercle** prominent bump

**Tuberculate** with tubercles or bumps



**Distribution of Species in Key:** (based on Anderson & Peck 1985, De Jong 2011, Lingafelter 1995, Peck & Kaulbars 1997; Peck & Miller 1993, Ratcliffe 1996, Rintoul et al. 2005, Sikes et al. 2002, and references therein, plus state checklists: Colorado at <https://bspm.agsci.colostate.edu/files/2013/03/Burying-Beetles.pdf>; Oklahoma at <http://entoweb.okstate.edu/museum/coleoptera/Silphidae.htm>), and McCain lab trapping records as well as museum specimens (CU, CSU, GBIF).

Species	CO	WY	NE	KS	OK	NM	AZ	UT	General Distribution
<i>Aclypea bituberosa</i>	x	x	P	P				x	SW Canada, NW US
<i>Heterosilpha ramosa</i>	x	x	x	P		x	x	x	W Canada, W US, N Midwest
<i>Necrodes surinamensis</i>	x	x	x	x	x	x		x	S Canada, US except SW
<i>Necrophila americana</i>			x	x	x	x			SE Canada, East US & E Midwest
<i>Nicrophorus americanus</i>			x	x	x				SE Canada, East US, Midwest
<i>Nicrophorus carolina</i>	x	x	x	x	x	x	x	x	SW Canada, SE US, West, W Midwest
<i>Nicrophorus defodiens</i>	x	x					x	x	Canada, AK, West US, N Midwest, East
<i>Nicrophorus guttula</i>	x	x	x			x	x	x	SW Canada, West US, NW Midwest
<i>Nicrophorus hybridus</i>	x	x	x			x	x	x	SW Canada, West US, NW Midwest
<i>Nicrophorus investigator</i>	x	x	x			x	x	x	Canada, Alaska, West US, W Midwest
<i>Nicrophorus marginatus</i>	x	x	x	x	x	x	x	x	S Canada, most of US
<i>Nicrophorus mexicanus</i>	x		x	x	x	x	x	x	SW US, Mexico
<i>Nicrophorus nigrita</i>	x*					x*			Coastal West US & SW Canada (SW US)
<i>Nicrophorus obscurus</i>	x	x	x	x	x			x	SW Canada, N West US, NW Midwest
<i>Nicrophorus orbicollis</i>	x		x	x	x			x	S Canada, E US, Midwest, E West
<i>Nicrophorus pustulatus</i>	x**		x	x	x			x	S Canada, East US, Midwest
<i>Nicrophorus sayi</i>					x				Canada, Eastern US
<i>Nicrophorus tomentosus</i>	x	x	x	x	x	x	x	x	S Canada, East US, Midwest, E West
<i>Nicrophorus vespilloides</i>	†								Canada, Alaska, Far NE US, N Midwest
<i>Oiceoptoma inaequale</i>	P		x	x	x				SE Canada, East US & S Midwest
<i>Oiceoptema noveboracense</i>	x	x	x	x	x				S Canada, NE US, N Midwest & E West
<i>Oiceoptoma rugulosum</i>					x				SE US
<i>Thanatophilus coloradensis</i>	x	x				x		x	West US
<i>Thanatophilus lapponicus</i>	x	x	x	x	x	x	x	x	Canada, AK, West US, N Midwest & East
<i>Thanatophilus sagax</i>	x	x						x	Canada, Alaska, E West US, NW Midwest
<i>Thanatophilus truncatus</i>	x		x	x	x	x	x		West US, W Midwest

P = possible; some disagreement in literature

\*based on one correctly identified specimen from Mesa Verde National Park UCMC 0302456 (McCain) and two correctly identified specimens OSUC 230733 & OSUC 230730 from NM (verified by Dr. Luciana Musetti, OSU)

\*\*based on one correctly identified specimen from Julesburg, CO in the CSU Gillette collection

† potential CO specimens (OSUC 227937: misidentified—actual species = *N. defodiens*; CSU 1920s specimen: misidentified—actual species = *N. tomentosus* [mostly worn-off pronotum pubescence]).

**Other North American Species** (citations above, and Márquez et al. 2015; Peck & Anderson 1985)

Species	Currently Accepted Distribution
<i>Aclypea opaca</i>	Alaska, NW Canada
<i>Heterosilpha aenescens</i>	West Coast from Oregon to Baja CA
<i>Oxelytrum disciolle</i>	South America, Central America, and Mexico* [7 SA species also in this genus]

<i>Thanatophilus trituberculatus</i>	Alaska and W Canada through Ontario
<i>Thanatophilus graniger</i>	Endemic to Mexican highlands (similar to <i>T. lapponicus</i> , brown pubescence)
<i>Silpha tristis</i> (introduced)	Detected in Quebec, Canada
<i>Nicrophorus olidus</i>	Mexico, Central America [predominantly orange elytra; elytral hair like <i>orbicollis</i> ]
<i>Nicrophorus quadrimaculatus</i>	Mexico, Central America [3 SA <i>Nicrophorus</i> species]

\* S Texas specimen considered a mistake in tag locality (see Mullins et al. 2013)

## Acknowledgements:

We would like to thank Chuck Harp and the curators from the Colorado State C.P. Gillette Museum of Arthropod Diversity, Dr. Deane Bowers and Virginia Scott from the Entomology section of the University of Colorado Museum of Natural History, and Kyle Schnepf and Dr. Paul Skelley from Florida State Collection of Arthropods for specimen access and loans. We would also like to thank Dr. Luciana Musetti at the Ohio State Museum for verifying the identifications of three important carrion beetle specimens in their collection. And of course, all of the collectors for their invaluable specimens.

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**Please cite this updated key as:** McCain, C.M., Monk, E., Hinson, K., Szewczyk, T., and D’Oench, H. 2021. Key to the carrion beetles (Silphidae) of Colorado and neighboring states. [http://spot.colorado.edu/~mccainc/PDFs/Key to Silphidae of Colorado.pdf](http://spot.colorado.edu/~mccainc/PDFs/Key%20to%20Silphidae%20of%20Colorado.pdf).

**Previous version:** Monk, E., Hinson, K., Szewczyk, T., D’Oench, H., and C. M. McCain. 2016. Key to the carrion beetles (Silphidae) of Colorado and neighboring states.

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