The Genus *Eleodes* Eschscholtz (Coleoptera: Tenebrionidae) in Texas

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THE GENUS \textit{Eleodes} Eschscholtz (Coleoptera: Tenebrionidae) IN TEXAS

\textbf{Charles A. Triplehorn}  
Department of Entomology  
The Ohio State University  
Columbus, OH 43210, U.S.A.  
Ctriphln@aol.com

\textbf{Donald B. Thomas}  
USDA-ARS Subtropical Agriculture Research Center  
Weslaco, TX 78596, U.S.A.  
donald.thomas@ars.usda.gov

\textbf{AND}

\textbf{Edward G. Riley}  
Department of Entomology  
Texas A&M University  
College Station, TX 77843, U.S.A.  
egrchryso@tamu.edu

\textbf{Abstract}


\textbf{Resumen}


The darkling beetles of the genus \textit{Eleodes} Eschscholtz are conspicuous faunal elements of the dry regions of western North America. The name is derived from
the Greek meaning “olive-like” and one would not be too remiss in describing the larger species as resembling a black olive with legs. All of the species are black to dark brown in color, ranging in size from 10 to 50 mm in length. They are flightless and thus most commonly encountered walking on the ground surface in desert or semidesert areas, sometimes during the day, but more commonly at twilight or after dark. A characteristic behavior is one of head standing, analogous to the posturing of skunks, and like the latter, the beetles have a pair of perianal scent glands from which they are able to spray a repugnatorial fluid meant to dissuade predators.

The larvae are found in the soil and, like the adults, are scavengers mainly on dead plant material although some species are pests of dryland wheat, destroying the planted seed and seedlings. The latter are referenced in the economic literature as “false wireworms.” Because they are an evolutionarily successful group, there are a large number of species in North America. The most recent listing (Thomas 2005) has 395 species-group names, but allowing for synonymy and/or subspecies status, Tanner’s (1961) checklist of 235 valid species is probably closer to the mark. The current year represents the 100th anniversary of the last comprehensive revision of the genus by Frank Blaisdell (1909). One of the earliest of modern taxonomists, Blaisdell recognized the prevalence of intraspecific variation and emphasized the difficulty in distinguishing species. It is normal to have character variation among individuals, but because Eleodes are flightless, the variation over a wide range can have a regional pattern. Also, several species are restricted to pinyon-juniper forests at higher elevations and thus have disjunct distributions. Consequently, regional taxonomic treatments of more limited geographic scope, such as those by Tanner and Packham (1965), Lago (1988), or Triplehorn (1996), are often of greater utility than the comprehensive monographs for identification purposes. It is in that spirit that the present contribution is offered. Within the state of Texas a total of 31 species are known to occur. Herein we provide a key with illustrations and a brief diagnosis for identification of each species, along with notes on ecology and distribution.

Material and Methods

The specimens examined for this study came primarily from the entomology collections at Texas A&M University, Texas Tech University, The Ohio State University, Stephen F. Austin State University, the University of Texas-Brackenridge Field Laboratory, and secondarily from the private collections of the junior authors. Dots on the Texas distribution maps indicate county records, not precise collection locations.

Diagnosis of Eleodes Eschscholtz

The most recent key to the genera of Tenebrionidae in North America is that of Aalbu et al. (2002) which also includes a key to the subgenera of Eleodes. However, the subgenera are defined primarily by genitalic characters. Fortunately, the genera with which species of Eleodes are most likely to be confused, Coelocnemis, Neobaphion, and Blaps, do not occur in Texas. The following combination of characters defines the genus Eleodes.

Black (or dark brown) in color, rarely with a reddish stripe on dorsal midline of elytra. Body length 10–50 mm, wingless, head not deeply inserted. Tarsal formula 5-5-4; abdomen with visible membrane between visible sternites III and IV; middle and hind tibiae lacking carina on outer margin and never expanded
apically; head not dilated laterally before eyes; eyes transverse, subreniform; epicranial sutures obsolete; fronto-clypeal suture indistinct; labrum clearly exposed; first five antennomeres longer than wide, longer than following segments, and all segments with simple, setiform sensilla (never stellate). Elytral epipleura gradually narrowing posteriorly. Procoxae globose, meso- and metacoxae transverse and separated by at least width of a coxa.

**Key to the Eleodes beetles of Texas**

As with most keys, and especially in the case of *Eleodes*, choices within each dichotomy are more reliable when applied to series representing both genders rather than single specimens. Ambiguities which can be anticipated include the size of individual specimens and the conformation of the profemur. Because *Eleodes* species fall naturally into large or small in size, the first couplet uses a length of 20 mm as the point of separation. The user is advised, however, that this dimension is the nadir of a bimodal distribution rather than an absolute division. The profemur is diagnostic because the males of many species have a preapical tooth on the anterior margin. In such species the females, when lacking the tooth, have the preapical margin distinctly sinuated, as opposed to an even, uninterrupted margin. However, among those species which lack the tooth (or the female sinuation) there are two which have the profemur clavate, which can be mistaken for sinuate. Lastly, it is recommended that once a specimen is determined through the key, the integumental sculpturing be matched against that shown in the illustrations and described in the diagnoses, as that feature tends to be characteristic for most of the species.

1. Larger species, 20 mm or more in length ........................................ 2
1’. Smaller species, up to 20 mm in length .......................................... 15
2(1). Profemur mutic (unarmed), anteroventral margin entire ................. 3
2’. Profemoral margin sinuate preapically (females) or bearing a prominent preapical tooth (males) .................................................. 7
3(2). Elytra caudately produced, more strongly so in males (Figs. 30–31) .......................... *E. caudiferus* LeConte
3’. Elytra not caudate ........................................ 4
4(3’). Elytral surface smooth (Figs. 36–37) ........................................ 4
4’. Elytral surface costulate and/or muricate (Figs. 4–6) .......................... 5
5(4’). Elytra finely, densely tuberculate, luster dull (Fig. 5) ................. 6
5’. Elytra with simple or finely muricate punctures, luster shiny ........... 6
6(5’). Elytra usually with strong asperate spicules on apical declivity along crest of intervals; disc punctate- striate with intervals slightly convex (Fig. 4) (east of Pecos River) ........................................ 6
6’. Elytra not asperate on apical declivity, disc usually not striate, or if so, then intervals flat (Fig. 6) (Chisos and Davis Mountains) .......................... *E. wenzeli* Blaisdell
7(2’). Each elytron with sutural and three discal costae (Figs. 26–27) .......................... *E. mirabilis* Triplehorn
7’. Elytra without costae ........................................ 8
8(7’). Sides of elytra carinate, at least at humeri ............................... 9
8’. Sides of elytra evenly convex ........................................ 10
9(8). Pronotal dorsum concave, margins reflexed; sides of elytra carinate for entire length (Fig. 25) ......................................................... *E. suturalis* (Say)

9’. Pronotal dorsum convex, margins not reflexed; sides of elytra carinate only near humeri (Fig. 24) ..................................................... *E. acutus* (Say)

10(8’). Anterior angles of pronotum acute, usually prominent, often dentiform ................................................................. 11

10’. Anterior angles of pronotum obtuse, rounded (Fig. 23) ............................................... ............................... 

11(10). Elytral punctures simple (caution: the “*nuptus*” form of *hispilabris* will key here) .......................................................................................................................... 12

11’. Elytral punctures often muricate (either strial or intervals or both) ...................................................................................... 14

12(11). Abdomen swollen, especially in female, males caudate; pronotum transverse, lateral margins subparallel, not narrowed toward base, widest near middle (Fig. 34) ....................................................... *E. spinipes* Solier

12’. Abdomen parallel-sided to ovate; apex caudate or not; pronotum subquadrate, widest in anterior half ................................. 13

13(12’). Elytral apex caudate (males) or attenuate (females) (Figs. 32–33) ............................................................. *E. tenuipes* Casey

13’. Elytral apex rounded in both sexes (Fig. 29) ................. *E. gracilis* LeConte

14(11’). Elytral surface striato-punctate, intervals costate, especially at sides posteriorly (Fig. 28) ......................................................... *E. hispilabris* (Say)

14’. Elytral surface irregularly punctate, intervals not costate, sometimes rugose (Fig. 35) ................................................................. *E. sponsus* LeConte

15(1’). Mentum with median carina; antennae long and slender, terminal 4 or 5 segments extending caudad beyond pronotal base; rare, restricted to caves in Big Bend area (*Caverneleodes*) ............................................. 16

15’. Mentum without median carina; antennae relatively stout, only 2 or 3 segments extending caudad beyond pronotal base; found in open habitats ................................................................. 17

16(15). Mentum with median longitudinal carina rising abruptly to form conspicuous finger-like process (Fig. 39) ................. *E. labialis* Triplehorn

16’. Mentum with median longitudinal process only rising slightly anteriorly and with apex acute (Fig. 38) ........ *E. easterlai* Triplehorn

17(15’). Body distinctly dorso-ventrally compressed; pronotum flattened, about as wide as elytra; elytra broad, flattened, truncate at base, sides abruptly declivent, humeral angles rectangular and prominent (Figs. 3, 15–16, 21–22) ................................................................. 18

17’. Body cylindrical; pronotum subquadrate, convex, always narrower than elytra; sides of elytra convex, humeral angles obtuse, not prominent ................................................................. 20

18(17). Base of thorax overlapping base of abdomen; elytra alternately costate (Fig. 3) ......................................................... *E. tricostatus* (Say)

18’. Base of thorax not overlapping base of abdomen; elytra regularly costulate ................................. 19

19(18’). Base of elytra prolonged to embrace thorax laterally (Figs. 15–16) (panhandle) ............................................................ *E. opacus* (Say)

19’. Base of elytra truncate, closely apposed to thorax (Figs. 21–22) (coastal bend) ......................................................... *E. veterator* Horn

20(17’). Anterovertral margin of profemur sinuated preapically (females) or with a tooth (males) .............................. 21
20'. Anteroventral margin of profemur unarmed, straight (except males of *E. nigrinus* and *E. arcuatus* which have the profemora clavate and preapical margin notably arcuate) ........................................... 25
21(20). Elytral surface finely muricate ........................................ 22
21'. Elytral surface smooth, punctate-striate ................................ 23
22(21). Integument dull, opaque; basal three protarsomeres of male with pads or tufts of golden setae on plantar surface (Figs. 19–20) .................................................. *E. spiculiferus* Triplehorn
22'. Integument shiny; basal three protarsomeres with open plantar grooves (males may have tuft of setae on basal segment) (Figs. 7–8) .................................................. *E. extricatus* (Say)
23(21'). Elytra with double series of small, closely spaced punctures (Figs. 11–12) .......................................................... *E. striolatus* LeConte
23'. Elytra with strial punctures uniserial ..................................... 24
24(23'). Elytral striae formed by large, widely spaced dents; integument shiny (Figs. 9–10) .................................................. *E. goryi* Solier
24'. Elytral striae formed by fine punctures; integument dull (Figs. 17–18) .................................................. *E. knullorum* Triplehorn
25(20). Elytral surface muricate to granulate, opaque; profemoral margin of males arcuate, often microcrenulate ............................................. 26
25'. Elytral surface smooth, finely punctate, usually shiny; profemoral margin entire .......................................................... 27
26(25). Elytra with muricate punctures; size larger, 18–22 mm (Fig. 40) .................................................. *E. nigrinus* LeConte
26'. Elytra without muricate punctures; size smaller, 12–16 mm (Figs. 43–44) .................................................. *E. arcuatus* Casey
27(25'). Body fusiform, pronotum widest base to middle; humeral angles of elytra embracing base of pronotum (Figs. 13–14) .................................................. *E. fusiformis* LeConte
27'. Body not fusiform, pronotum widest anterior to middle; humeral angles truncate in apposition to base of pronotum .............. 28
28(27'). Mentum without prominent middle lobe; body slender, length usually less than 15 mm ........................................... 29
28'. Mentum with prominent subtriangular middle lobe directed forward with arcuate apex; body robust, often 15–20 mm in length ........... 30
29(28). Pronotum widest in anterior third, anterior margin wider than posterior margin; elytra narrow, more or less parallel-sided (Fig. 41) .................................................. *E. dissimilis* Blaisdell
29'. Pronotum widest at middle, anterior and posterior margins subequal in width; elytra more or less ovate in dorsal view (Fig. 42) ............................... *E. delicatus* Blaisdell
30(28'). Small, seldom more than 14 mm in length (Fig. 1); protibial spurs in females unequal in size, upper larger than the lower .................................................. *E. debilis* LeConte
30'. Larger, usually more than 15 mm in length; protibial spurs equal in size in both genders (Fig. 2) .................................................. *E. carbonarius* (Say)

Subgenus *Melaneleodes* Blaisdell, 1909

Six Texas species are assignable to this subgenus. The external apical lobe of the ovipositor is well developed (obsolete in other subgenera). In these species the profemora are unarmed and there is typically a sexual dimorphism in the relative
size of the protibial spurs. Several of the species, the “tricostatus” group, have a characteristic depressed fusiform shape (Blaisdell 1909).

**Eleodes carbonarius** (Say, 1823)  
(Fig. 2, Map 1)

**Diagnosis.** This species is ovate and convex but extremely variable in size, sculpture, and luster which makes it difficult to characterize. There are at least nine distinct populations which are recognized as subspecies, three of which occur in Texas. *Eleodes c. carbonarius* is shiny or glossy with punctate-striate elytra consisting of simple punctures with intervals slightly convex; *E. c. obsoletus* (Say) is similar but with opaque integument and muricate punctures; *E. c. soror* LeConte (type-locality Eagle Pass), is usually smaller with the pronotum subquadrate and narrowed from base to apex. Length: 12–28 mm.

**Distribution.** *Eleodes c. carbonarius* is in west Texas, *E. c. obsoletus* in the panhandle, and *E. c. soror* in the lower Rio Grande valley. These subspecies and others also occur in the adjacent states of Mexico. The larva was described by St. George (1924) and the morphology of the repugnatorial glands described by Tschinkel (1975).

**Eleodes debilis** LeConte, 1858  
(Fig. 1, Map 7)

**Diagnosis.** This is a small species, ovate and convex in body shape, which resembles some *E. carbonarius* in punctation. It is glabrous and shining with the integument finely and sparsely punctulate. The pronotum is subquadrate and widest at the middle. The anterior and posterior protibial spurs are distinctly dissimilar in size, especially in the female. Length: 12–15 mm.

**Distribution.** This species is rather common in West Texas (Brewster, Culberson, Jeff Davis, Presidio counties), especially at upper elevations. The type-locality is in New Mexico. In Mexico, it ranges as far south as Aguascalientes.

**Eleodes neomexicanus** Blaisdell, 1909  
(Fig. 5, Map 15)

**Diagnosis.** The dull luster and densely tuberculate elytra without costae will separate this species from others in the *tricostatus* group. This species was originally described as a subspecies of *E. pedinoides*. Length: 18–23 mm.

**Distribution.** The only Texas record for this species is Van Horn (Culberson County). As the name implies, the type locality is in New Mexico. Even there it is rarely collected.

**Eleodes pedinoides** LeConte, 1858  
(Fig. 4, Map 3)

**Diagnosis.** Similar in shape to *E. tricostatus*, but glabrous and shining. The pronotum is widest at the middle and about twice as wide as the head. The elytra are sulcate, the intervals convex; there are usually acute tubercles laterally and apically. Length: 19–26 mm.

**Distribution.** Fairly common in the lower Rio Grande Valley (Cameron, Hidalgo, Starr counties) and has been collected as far north as King County. It also occurs in the border states of Mexico (Coahuila, Nuevo León, and Tamaulipas).
Diagnosis. Because of its dull color and depressed fusiform shape, this is a very distinctive, easily recognized species. The body is dorso-ventrally compressed, oblong-oval, somewhat parallel-sided, dull in luster, with three discal, one sutural, and a marginal costa on each elytron. The elytral intervals are sparsely clothed with minute recumbent setae. The elytra are widest at the base, thereafter narrowing to the apex. Length: 13–23 mm.

*Eleodes tricostatus* (Say, 1823)

(Fig. 3, Map 2)

*Diagnosis.* Because of its dull color and depressed fusiform shape, this is a very distinctive, easily recognized species. The body is dorso-ventrally compressed, oblong-oval, somewhat parallel-sided, dull in luster, with three discal, one sutural, and a marginal costa on each elytron. The elytral intervals are sparsely clothed with minute recumbent setae. The elytra are widest at the base, thereafter narrowing to the apex. Length: 13–23 mm.
Distribution. Generally distributed and common in Texas, this is the most widespread member of the genus, ranging from Canada to Mexico, as far west as Arizona and Montana and as far east as Wisconsin and Minnesota. It is a garden pest throughout its range (Parks 1918) and a pest of wheat in the prairie states where it is called the “false wireworm” (Calkins and Kirk 1975). Maxwell and Young (1998) provide a good overview of the biology and distribution of this species.

Eleodes wenzeli Blaisdell, 1925
(Fig. 6, Map 3)

Diagnosis. This species may be recognized by its smooth, finely sculptured integument and deep black, alutaceous luster. It is similar to *E. pedinoides* in having the elytral disc flattened. Length: 17–21 mm.

Distribution. Known only from high elevations in west Texas (Chisos, Davis, and Guadalupe Mountains). The type specimens were collected by H.A. Wenzel in the Chisos Mountains of Big Bend National Park. *Eleodes speculicollis* Blaisdell, 1925, described from the Davis Mountains, is a synonym.

Subgenus *Litheleodes* Blaisdell, 1909

Recognition of this subgenus is based primarily on the structure of the female genitalia. The apical segment of the ovipositor is quadrate and thickly clothed with hairs. Males of some species have the profemora dentate. Only one of the species in this subgenus is common anywhere, the widespread *E. extricatus*. 
**Eleodes arcuatus** Casey, 1890
(Figs. 43–44, Map 14)

**Diagnosis.** A small, oblong-ovate species with the integument finely punctate and dull in luster. Pronotum subquadrate, slightly wider than long, widest near the middle; anterior angles prominent; surface of disc sparsely, minutely punctulate. Prosternal process horizontal and acute apically. Base of abdomen about equal in width to base of thorax; elytral surface with small punctures arranged in series on disc, becoming confused laterally. Femora are clavate, feebly

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**Figs. 7–12.** 7) *Eleodes extricatus* ♂, 8) *E. extricatus* ♀, 9) *E. goryi* ♂, 10) *E. goryi* ♀, 11) *E. striolatus* ♂, 12) *E. striolatus* ♀.
arcuate preapically in both genders; protarsal groove without pads of golden setae. Length: 12–16 mm.

**Distribution.** Texas specimens were collected in the Davis Mountains. The species ranges west to Arizona where it is more common; also known from Sonora and Chihuahua in Mexico.

*Eleodes extricatus* (Say, 1823)  
(Figs. 7–8, Map 5)

**Diagnosis.** A small, convex, somewhat fusiform (especially the male), glabrous species. The elytra have approximate rows of moderately coarse punctures. The pronotum is subquadrate and finely punctate. The profemora are dentate in the male, sinuate in the female. A pencil of golden setae interrupts the basal protarsomere in the male. Length: 11–15 mm.

**Distribution.** In Texas, this species occurs in the far west and panhandle. It ranges from Alberta, British Columbia, and Saskatchewan in Canada, south to Sonora and Chihuahua in Mexico. Parmenter *et al.* (1989) reported on diel periodicity in activity of this species in the Wyoming rangelands.

**Subgenus Promus** LeConte, 1862

The female genitalia are distinctive in that the dorsal plates at the apex of the ovipositor are broad and setose. In the males, the underside of the first and typically the first and second protarsomeres (Texas species) are flattened and
densely clothed with a fine pubescence. In most of the species, the profemora are dentate in males, sinuate in females. Six species occur in Texas.

**Eleodes fusiformis** LeConte, 1858

(Figs. 13–14, Map 6)

**Diagnosis.** Fusiform, body narrowing equally from base to apex, smooth and shining. The pronotum transverse, narrowing anteriorly, with the basal angles rounded, the anterior angles acute, the disc finely punctate. The elytra with humeral angles prolonged, embracing the pronotal base. The profemora are mutic
in both sexes. The basal two segments of the male protarsi are densely clothed beneath with a flattened pad of spongy, golden pubescence; the female protarsi are unmodified. Length: 13–18 mm.

**Distribution.** Most abundant in central and western Texas though it ranges north through Colorado, Kansas, and Wyoming. Wise (1981) found it to be the most abundant tenebrionid in the high grasslands of central New Mexico.

*Eleodes goryi* Solier, 1848
(Figs. 9–10, Map 4)

**Diagnosis.** This is an ovate, somewhat ventricose species, usually with coarsely punctured elytral striae (in some individuals the punctures are fine); the punctures are scattered, not in grooves. The elytra are convex, without lateral margins. The profemora are dentate in the male, feebly toothed or simply sinuate in the female. The basal two protarsomeres are thickened, dilated and clothed beneath with dense, spongy-pubescent pads of setae in the male; the female tarsi are unmodified. Length: 15–21 mm.

**Distribution.** Common in the southern half of Texas. It also occurs in New Mexico and in the eastern part of Mexico, as far south as Puebla.

*Eleodes knullorum* Triplehorn, 1971
(Figs. 17–18, Map 8)

**Diagnosis.** This is a dull, elongate species with the profemora dentate in the male, sinuate in the female. The elytra are finely punctate-striate with intervals
feebly convex and minutely punctate. The basal protarsomere in the male is clothed beneath with a conspicuous tuft of golden setae interrupting the plantar surface (in some males, the second basal protarsomere is also clothed with a similar tuft). Length: 14–19 mm.

**Distribution.** In Texas, this species is found in the western part of the state eastward to Bexar County. It is also known from extreme southern New Mexico and Arizona. It is widely distributed in Mexico from the border states south to Hidalgo.
Eleodes opacus (Say, 1823)
(Figs. 15–16, Map 7)

**Diagnosis.** Fusiform-oval, opaque, sparsely clothed with white or yellowish recumbent setae. The dorsum of the elytra is typically flat with acute lateral margins, but specimens from around Mobeetee, Texas have three feeble costae (Blaisdell 1909). The humeral angles of the pronotum are prolonged, embracing the obtusely rounded basal angles of the abdomen; pronotum widest at the base and about twice as wide as the head. The profemora are mutic in both sexes. Length: 10–14 mm.

**Distribution.** In Texas, this species is known from the panhandle and west central counties. Elsewhere in the United States, it is found from Oklahoma to the Great Plains north into Canada. It is the most destructive false wireworm to wheat in Kansas and South Dakota (McColloch 1922; Calkins and Kirk 1973).

Eleodes spiculiferus Triplehorn, 2007
(Figs. 19–20, Map 7)

**Diagnosis.** This is a medium-sized species in which the elytral surface is densely papillose, each papilla bearing a short, pale, recumbent seta. The pronotum is broader than long, the basal and apical angles obtusely rounded. The profemora are dentate in the male, mutic in the female. In the male, the basal protarsomere has a dense pad of golden setae. Length: 14–17 mm.
Distribution. Known only from four (Anderson, Freestone, Leon, Montague) counties in northeastern Texas. The habitat is sandy oak woodland.

**Eleodes striolatus** LeConte, 1858
(Figs. 11–12, Map 5)

**Diagnosis.** This species is easily recognized by the closely spaced double row series of fine elytral punctures. The profemora are dentate in the male, sinuate in the female. The body is fusiform (male) to ovate (female) and both sexes are
briefly caudate. The basal two protarsomeres of the male are thickened, dilated, and with spongy-pubescence beneath as in *E. goryi*. Length: 18–23 mm.

**Distribution.** South-central Texas, Rio Grande valley as far north as Burleson County. No records are available for Mexico, but it probably occurs in the northern states as the type locality, Laredo, is on the border and many of LeConte’s specimens were collected by him around the Ringold Barracks (now Rio Grande City).

**Subgenus Heteropromus Blaisdell, 1909**

This subgenus is monotypic. The dorsal plates at the apex of the female ovipositor are small, triangular, and lack an appendage. The femora are unarmed and the male has the basal two protarsomeres nondilated, with only a small transverse tuft of golden pubescence.

**Eleodes veterator** Horn, 1874

(Figs. 21–22, Map 6)

**Diagnosis.** This is a small, oval species with the pronotal base truncate, closely apposing the elytral base which is also truncate. The dorsal surface is sparsely setose. The profemora are unarmored in both sexes. Length: 10–11 mm.

**Distribution.** Occurs in counties of the coastal bend. It has also been collected in Cameron County, Louisiana. Horn’s type came from “Texas.”

**Subgenus Eleodes Eschscholtz, 1829**

The dorsal plates at the apex of the female ovipositor are oblong and strongly concave with the margins reflexed. The apex of the appendage has tufts of hairs. In most species, the male profemora are dentate. The protarsi may or may not be thickened. Ten Texas species belong to this subgenus.

**Eleodes acutus** (Say, 1823)

(Fig. 24, Map 8)

**Diagnosis.** Very large, elongate-oblong, somewhat flattened dorsally; lateral margins of elytra acute only at humeri. Elytra often reddish along the suture. Profemora are dentate in both sexes. The pronotum is convex and smooth, widest at the middle, with the lateral margins not reflexed. Length: 21–35 mm.

**Distribution.** Generally distributed in Texas. Also found in the Great Plains states from South Dakota to New Mexico and Arizona. There are no records for Mexico or Canada.

**Eleodes caudiferus** LeConte, 1858

(Figs. 30–31, Map 14)

**Diagnosis.** In this species, the pronotum is slightly convex, punctate, feebly concave laterally and transversely rugose. The elytra are slightly flattened, punctate-striate, the intervals sparsely punctate and muricate laterally and apically. The Texas population was assigned by Blaisdell (1909) to the *forma glabra* in which the elytra are smoother and less muricate. Both males and females are caudate (longer in the male) and the profemora are mutic in both sexes. Length: 22–30 mm.
Distribution. Texas records are from Brewster, El Paso and Winkler counties. It is common in the "four corners area" of the U.S.A. and the senior author has seen one specimen from Chihuahua, Mexico. Tschinkel (1975) discusses the head-standing posture and defensive secretions in *Eleodes* with this species as the exemplar.

*Eleodes gracilis* LeConte, 1858
(Fig. 29, Map 13)

Diagnosis. This is an elongate, subfusiform species with smooth, shiny black integument. The pronotum is subquadrate, slightly wider at the middle. The
elytra are punctate-striate, feebly sulcate, with simple punctures and very few fine punctures on the intervals which are slightly convex. The profemora are dentate in both sexes. Length: 20–28 mm.

**Distribution.** Occurs from southern California through Arizona and New Mexico into extreme west Texas. It is also found in the Mexican state of Sonora. Smith and Whitford (1976) found it to be summer active with a high thermal tolerance. Kramm and Kramm (1972) found it hiding in ground squirrel holes.

_Eleodes hispilabris_ (Say, 1824)  
(Fig. 28, Map 11)

**Diagnosis.** Elongate-oval, convex, shining, elytra sulcate, pronotum with apical angles dentiform; profemora dentate in male, sinuate in female. Three subspecies occur in Texas: _E. h. hispilabris_ (Say), elytra usually somewhat depressed or flattened, sulci moderate in depth, frequently reddish along suture; _E. h. convexus_ LeConte, integument black, strongly shining, sulci deep, intervals moderately to strongly convex; _E. h. nuptus_ LeConte, robust, strongly convex or even ventricose, elytra shining, pronotum dull, sulci moderate to deep, intervals convex or flat. Length: 19–29 mm.

**Distribution.** _Eleodes h. hispilabris_ occurs in the panhandle of Texas; _E. h. convexus_ is found in extreme west Texas (El Paso area); _E. h. nuptus_ occurs in west, central and south Texas. The species ranges from Alberta and British Columbia, Canada to Sonora, Chihuahua, and Coahuila, Mexico. According to Sheldon and Rogers (1984), it is an ecological generalist found in varying habitats and without a distinct seasonality.

_Eleodes mirabilis_ Triplehorn, 2007  
(Figs. 26–27, Map 9)

**Diagnosis.** This is an easily recognized, large species. The sculpture of the elytra consists of five discal costae with the intervals between them flat and clothed with short, black setae, which are usually coated with clay-like material, causing the shiny costae to stand out in bold relief. Both males and females are caudate, the cauda longer in the male. Length: 30–32 mm.

**Distribution.** This species is rare in collections. It is known from the Mexican states of Nuevo León, San Luis Potosí, and Tamaulipas. The only Texas record is one specimen collected at Comstock in Val Verde County.

_Eleodes obscurus_ (Say, 1823)  
(Fig. 23, Map 9)

**Diagnosis.** This is a large, stout, oblong-oval species with rounded elytral margins. The anterior angles of the pronotum are obtuse. The profemora are dentate in both sexes. Two subspecies occur in Texas: In _E. o. obscurus_, the elytra are feebly sulcate, intervals slightly convex, sparsely and muricately punctate, more strongly so laterally and apically. In _E. o. glabriusculus_ Blaisdell, the punctures of the elytral striae are coarse and somewhat irregular, the intervals with a single series of similar punctures, laterally and apically the punctures become more or less asperate. Length: 25–35 mm.

**Distribution.** There is only one Texas record for the nominate subspecies (Potter County), which is the easternmost record for the species. _Eleodes o. glabriusculus_ occurs in west Texas. The species occurs in all states of the Great Plains and in
adjacent states of Mexico as far south as Durango. Kenagy and Stevenson (1982) studied the thermal ecology of this species.

**Eleodes spinipes** Solier, 1848

(Fig. 34, Map 12)

**Diagnosis.** Easily recognized by the large size, robust form, with the elytra strongly ventricose in both sexes, elytra slightly caudate in the male, feebly
produced in the female. Two subspecies occur in Texas: *E. s. ventricosus* LeConte has the pronotum broader than long with the apical angles acute and prominent, the basal angles rounded. In *E. s. macrurus* Champion, the pronotum is subquadrate, apical angles not prominent, hind angles obtuse but not rounded. In males, the elytra are not as inflated and the cauda is much longer. Length: 26–33 mm. *Eleodes ventricosus falli* Blaisdell is a synonym of *E. s. macrurus*.

**Distribution.** *Eleodes s. ventricosus* occurs in the lower Rio Grande valley of Texas, and *E. s. macrurus* is found in west Texas and Big Bend. There is some overlap and perhaps intergradation in the trans-Pecos area. Both subspecies extend into adjacent states of Mexico. The nominate subspecies, *E. s. spinipes*, characterized by strongly convex elytral intervals, occurs only in central Mexico from Nuevo León to Hidalgo.

*Eleodes sponsus* LeConte, 1858
(Figs. 35, Map 10)

**Diagnosis.** Elongate-oval and smooth. Pronotum with apical angles acute, prominent, and frequently everted. Elytra irregularly punctate-striate, intervals flat, usually coarsely, muricately punctate. Profemora dentate in males, usually sinuate but sometimes obtusely dentate in females. Length: 22–26 mm.

**Distribution.** In Texas, this species is confined to the west (Brewster, Culberson, Jeff Davis, Presidio, and Terrell counties). It is also found in the “four corners” states. Johnson *et al.* (1992) reported that this species hides in kangaroo rat mounds during the day, foraging around the mounds at night.

*Eleodes suturalis* (Say, 1823)
(Fig. 25, Map 10)

**Diagnosis.** Very large, elongate, elytral dorsum flattened and slightly concave, frequently reddish along the suture. Sides of the elytra have an acute, slightly reflexed margin with the surface sulcate. Pronotum deeply concave anteriorly, widest at the middle, lateral margins dilated and reflexed. Profemora are dentate in both sexes. Length: 21–35 mm.

**Distribution.** Widely distributed in Texas, *Eleodes texanus* Horn is a synonym of this species. The types of the latter were collected by LeConte at the “Ringold Barracks” which still exist at Rio Grande City. It is also found in the Great Basin states from North Dakota to Arizona. There are no records for Canada and Mexico. It is one of the false wireworms that are pests because the larvae feed on germinating wheat seeds (Calkins and Kirk 1973).

*Eleodes tenuipes* Casey, 1890
(Figs. 32–33, Map 15)

**Diagnosis.** Elongate-oval, smooth and shining. The apical angles of the pronotum are dentiform and everted. The elytra have unimpressed rows of fine, simple punctures; the flat intervals have a single row of finer punctures. The male profemur has a slender, acute tooth. Both sexes are caudate. Length: 29–32 mm.

**Distribution.** Very rare. The type locality is El Paso and in Texas it is only known from that area. Smith and Whitford (1976) reported that it is a heat tolerant, summer active species in New Mexico.
Subgenus *Steneleodes* Blaisdell, 1909

The female genitalia are very distinctive and define the subgenus. The dorsal plate is elongate and the external lobe of the apex obsolete. The internal lobe is strongly chitinous and curved outwardly (bluntly sickle-shaped). The appendage is minute and not visible from above. The subgenus is well represented in Mexico, but only two species occur in the United States, one of them in Texas.

*Eleodes longicollis* LeConte, 1851
(Figs. 36–37, Map 16)

**Diagnosis.** Elongate to elongate-fusiform, subcylindrical, smooth and shining. The elytra are finely punctate and seriate. The pronotum is slightly broader than long, evenly convex, the convexity strongest transversely; both basal and apical angles obtuse, the anterior margin truncate. The females are flatter, broader, and quite distinct from the males. The profemur is mutic in both sexes. Length: 25–35 mm.

**Distribution.** In Texas, this species is found in the extreme western part of the state, including the Big Bend region. It is common in the Great Plains states as far north as Wyoming west to Oregon. In Mexico, it occurs in the states of Sonora, Chihuahua, Coahuila, south to Michoacán. Slobodchikoff (1978, 1979) described the defensive behavior of this beetle against potential predators, including the use of its repugnatorial fluid to immobilize harvester ants while foraging on their mounds.

Subgenus *Caverneleodes* Triplehorn, 1975

Form elongate and slender. The eyes are reduced, the antennae extremely long and slender with terminal 4–5 antennomeres extending beyond the pronotal base. The legs are long and slender. The female genitalia are similar to those in the subgenus *Metablapylis* Blaisdell, to which it is presumably related. Triplehorn and
Reddell (1991) provide a key to the five known species in the subgenus, two of which are found in Texas.

**Eleodes easterlai** Triplehorn, 1975
(Fig. 38, Map 15)

**Diagnosis.** Surface dull, minutely setose, body flattened dorsally. Eyes small, narrow, and distinctly flattened. Pronotum about equally long as wide, with greatest width in anterior third. Profemora unarmed. The mentum has a conspicuous longitudinal carina. Length: 13–19 mm.

**Distribution.** Known only from a cave on Emory Peak, Big Bend National Park. This cave contains the only U.S. population of the Mexican long-tongued bat, a nectar-feeding species.

**Eleodes labialis** Triplehorn, 1975
(Fig. 39, Map 16)

**Diagnosis.** Similar to *E. easterlai* but even more slender. The fronto-clypeal area of the head has a transverse concavity. The mentum has a conspicuous digitiform process. Length: 14–15.5 mm.

**Distribution.** Very rare. Known only from two specimens, both males, collected from rock fissures in Santa Elena Canyon, Big Bend National Park.

**Subgenus Metablapylis** Blaisdell, 1909

The anterior femora are never dentate (though in some males the femora are sinuate) and the anterior tarsi are simple. The middle lobe of the mentum is very small with the lateral lobes fully exposed, and lacking the median carina found in the species of *Caverneleodes*. The dorsal plates at the apex of the female ovipositor are oblong with a small mammiliform, penicillate appendage. Three species of the subgenus are newly recorded for Texas.

**Eleodes delicatus** Blaisdell, 1929
(Fig. 42, Map 13)

**Diagnosis.** Small, form fragile, very slender, elongate; dull black in color. Pronotum quadrate, about as long as wide, strongly convex; surface obsoletely punctate. The surface of elytra is finely, obsoletely punctate. The profemora of both sexes is slender, mutic. Length: 11–14 mm.

**Distribution.** Specimens are known from all of the southwestern states and from Baja California Norte. The Texas record is for Potter County.

**Eleodes dissimilis** Blaisdell, 1909
(Fig. 41, Map 14)

**Diagnosis.** Oblong-ovate to fusiform ovate in form, more slender than most species in the genus, dull to slightly shiny black. Pronotum subquadrate, widest at middle; dorsum evenly convex, surface finely and sparsely punctulate. Surface of elytra glabrous, punctate; the punctures arranged in series but widely spaced. Profemora of male sinuate, rarely subdentate near apex. Length: 14–19 mm.

**Distribution.** Occurs in Arizona, Nevada, Utah, New Mexico and Texas. The single Texas record, from Culberson County near the border of New Mexico at
Upper Dog Canyon in the Guadalupe Mountains, resides in the Texas Tech University collection.

*Eleodes nigrinus* LeConte, 1858
(Fig. 40, Map 13)

**Diagnosis.** Form elongate, subopaque in luster. Pronotum subquadrate, strongly convex; punctures fine, closely spaced. Surface of elytra murico-punctate on sides to granulate substriate on disc. Male profemur strongly arcuate with margin of arcuation microcrenulate. Length: 18–22 mm.

**Distribution.** Western North America, Canada to Mexico. For Texas, the only record is from Odessa in Ector County. Hyslop (1912) reported this species as common in oat fields in the Pacific Northwest.

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**Literature Cited**


Blaisdell, F. E. 1925. Revised checklist of the species of *Eleodes* inhabiting America, north of Mexico, including Lower California and adjacent islands. Pan-Pacific Entomologist 2:77–80.


LeConte, J. L. 1858. Note on the species of *Eleodes* found within the United States. Proceedings of the Academy of Natural Sciences, Philadelphia 10:180–188.


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