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Peltodytes Species New to Texas, with Habitat Notes (Coleoptera, Halaplidae)

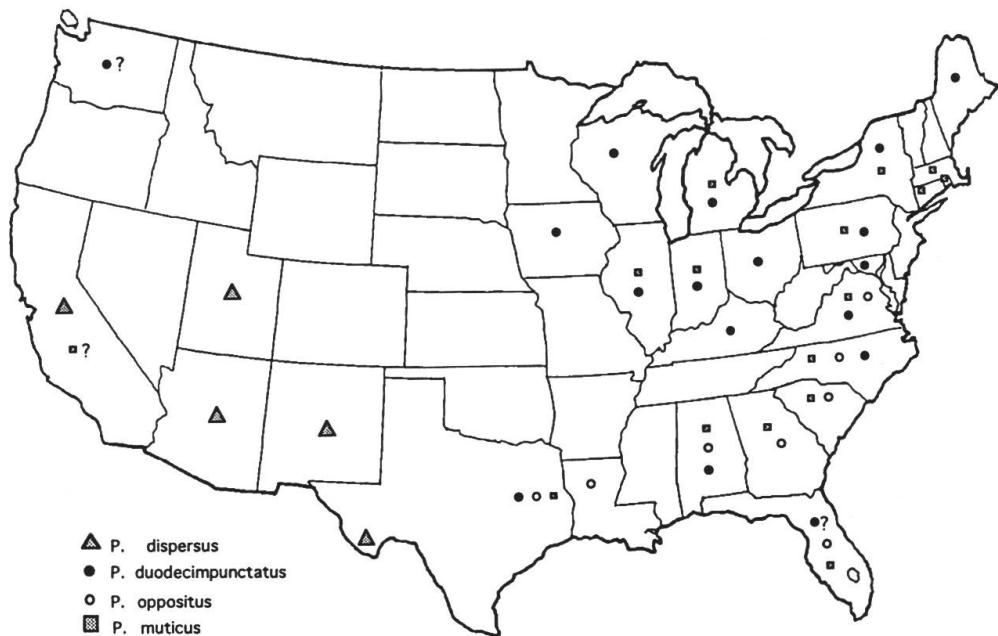
by S. Knight Jasper

Abstract: Five species of *Peltodytes* Rgimbart have been reported from the state of Texas, USA. An additional four species are added in this paper, with habitat notes on three species. The four species newly reported for Texas are *P. dispersus* Roberts, 1913, *P. muticus* LeConte, 1853, *P. oppositus* Roberts, 1913, and *P. duodecimpunctatus* Say, 1825.

Key words: Coleoptera – Halaplidae – *Peltodytes* – distribution – Texas – ecology – habitat.

Introduction

Five species of *Peltodytes* have previously been reported from the state of Texas, USA. These five species are *P. litoralis* Matheson, 1912, *P. pedunculatus* Blatchley, 1910, *P. sexmaculatus* Roberts, 1913, *P. festivus* Wehnke, 1876, and *P. dunavani* Young, 1961 (BLACKWELDER & ARNETT, JR., 1974; FOSTER, 1972; GLASS, 1950; MATHESON, 1912; MATTI, 1976; ROBERTS, 1913; YOUNG, 1954, 1961; ZIMMERMANN, 1924). Four of these have been commonly collected by the author, but *P. pedunculatus* has not been found yet. Specimens of *P. pedunculatus* from Texas are also not represented in the Insect Collection of the Entomology Department at Texas A&M University. *P. pedunculatus* was reported from Brownsville, Texas, by MATHESON (1912) and from Dallas County by GLASS (1950). Specimens from Texas of the other four species are present in the university's collection. This paper adds four species to the list of *Peltodytes* known from Texas: *P. dispersus* Roberts, 1913, *P. muticus* LeConte, 1853, *P. oppositus* Roberts, 1913, and *P. duodecimpunctatus* Say, 1825. This brings to nine the number of species of *Peltodytes* known from Texas, half of the eighteen species known from North America, north of Mexico. Current distribution for these species in the United States is given in Map 1, and in Texas in Map 2.



Map 1: Current known distribution in the United States

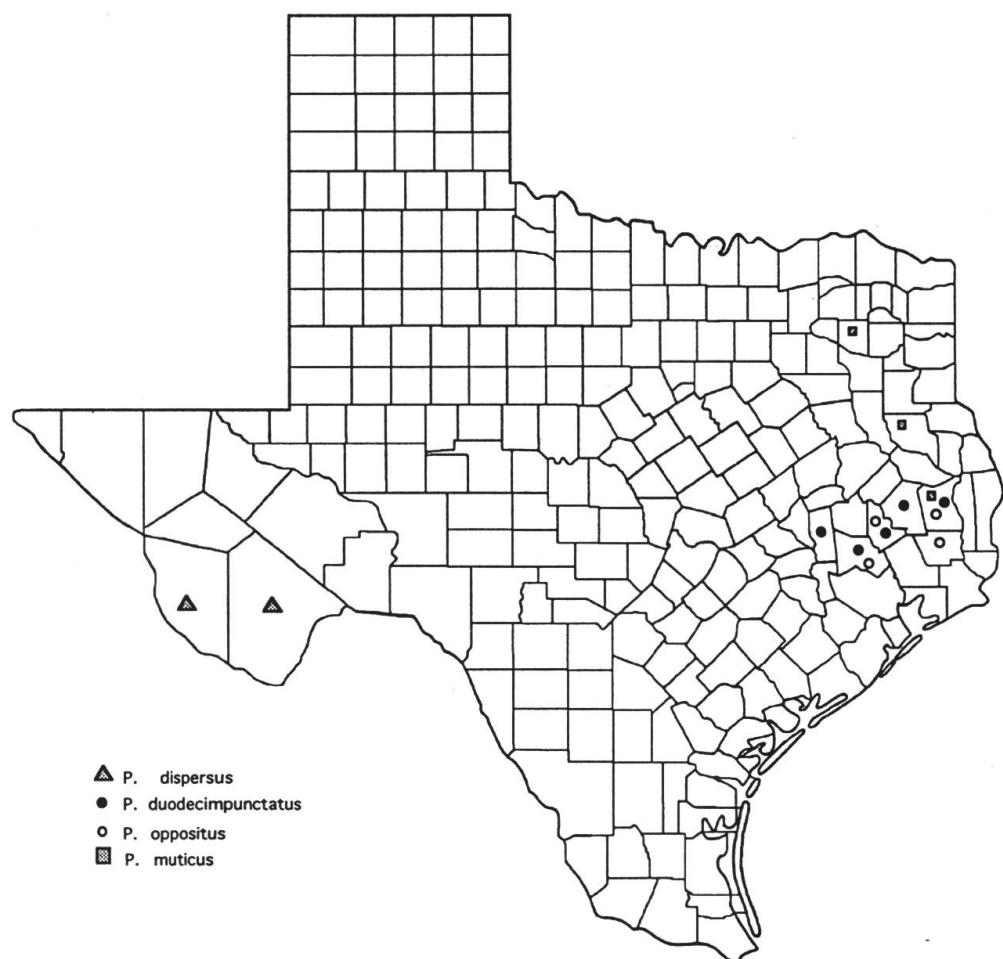
Material and methods

Beetles were collected with a standard D-ring dip net and placed into a jar of 70% ethanol for later identification in the laboratory. In a study of habitat selection in the family Haliplidae, collections were made along a transect which extended from B. A. Steinhagen Lake, Tyler County, westward to Inks Lake, Burnet County. Many types of habitats were sampled five or six times over a period of about 15 months. Collections were also made in other areas of Texas, mostly east of the Colorado River. In addition, the haliplids in the Insect Collection of the Entomology Department at Texas A&M University were inventoried.

Physicochemical measurements and observations were made at most of the sites. The substrate was grossly categorized as mud, sand or rock and the detrital cover estimated. Velocity (centimeters per second) of lotic waters was measured with a flowmeter when the water was not too shallow or too deep. Temperature (degrees Celsius) and dissolved oxygen (milligrams per liter) were measured with a Yellow Springs Instrument Corporations dissolved oxygen meter. Conductivity (micromhos) was measured with a Cole-Parmer Model 1500 conductivity meter. These parameters were measured and recorded on-site.

Laboratory tests for pH, total alkalinity (milligrams per liter of CaCO_3), and turbidity (nephelometric turbidity units [NTU]) were performed. A Devon Model 140 pH meter standardized with a 6.86 buffer was used to measure pH. Alkalinity was measured with the same meter by titration with 0.02 N sulfuric acid to an end point (Lind, 1979). Turbidity was measured with a Hach 2100A turbidimeter.

Identifications were made with a key to the species *Peltodytes* likely to occur in Texas or surrounding areas written by the author (unpublished), and confirmed by comparison of male genitalia with published drawings (BRIGHAM, 1982; MATTA, 1976; YOUNG, 1961) or by Bernhard van Vondel. Exceptions were the specimens of *P. dispersus* in the collection which were identified by Warren U. Brigham or David Dunavan.



Results and discussion

Peltodytes muticus LeConte, 1863, was previously reported from the states indicated on Map 1 and the Canadian provinces of Ontario and Quebec (BLACKWELDER & ARNETT, JR., 1974; BLATCHLEY, 1910; BRIGHAM, et al., 1982; BRIGHAM & SANDERSON, 1973; CHAGNON & ROBERT, 1962; FOLKERTS, 1978; KIRK, 1970; MALCOLM, 1971; MATHESON, 1912; MATT, 1976; ROUGHLEY, 1991; STAINES, 1986; WHITE, et al., 1985; YOUNG, 1954; ZIMMERMANN, 1924). YOUNG (1954) states that ZIMMERMANN'S (1924) record from California is probably incorrect. In addition, LEECH & CHANDLER (1956) did not include it in their list of aquatic Coleoptera of California.

Two specimens of *P. muticus* were found in Tyler County, Texas, in a dead-end slough (E49) surrounded by cypress (*Taxodium distichium* [L.] Rich.), pine (*Pinus* sp.), and magnolia (*Magnolia grandiflora* L.). The substrate was mud and the area was in constant shade. Results of the water chemistries are provided in Table 1. When the male specimen was found on 27 July 1991, there was no vegetation present in the water which was about 20 cm deep, but the bottom was completely covered by detritus. When the female specimen was found on 5 September 1992, an area of vegetation had developed that included *Polygonum punctatum* Ell., *Proserpinaca palustris* L. and *Panicum gymnocarpa* Ell., and detritus was still completely covering the bottom. The water was about 15 cm deep. Though the algae *Spirogyra* sp. and *Oedogonium* sp. were present, the amounts were very small.

A single specimen of *P. muticus* was taken in a spring-fed, sandy-bottomed stream in Tyler County. This constantly flowing stream boasted a healthy population of *Myriophyllum brasiliense* Camb. Surrounded by a grassy field, this stream was in full sunlight, had little detritus and no filamentous algae. Its depth did not exceed 20 cm.

Site	Date	Tem	pH	DO	Con	Tur	Alk	# Ind
E49	Jul 27, 1991	25	5.8	3.5	42	45	44	1
E49	Sep 5, 1992	24	5.9	2.2	17	39	9	1
E51	Sep 6, 1992	22	6.2	8.7	7	60	3	1

Table 1: *Peltodytes muticus* Physical-Chemical Data.

● = no data available. Units of measure: = Tem = (temperature) in °C; DO = (dissolved oxygen) in milligrams per liter; Tur = (turbidity) in NTU (nephelometric turbidity units); Con = (conductivity) in μ mhos (micromhos); Alk = (alkalinity) in milligrams per liter of CaCO_3 .

Four specimens were taken from a spring-fed stream near Mineola in Wood County on 11 June 1994 by the author. This shady stream was no more than 20 cm deep, with a sandy bottom and vegetation along the margins. One specimen of *P. muticus* was taken at an ultraviolet light in Nacogdoches County near Naconiche Creek on 11 July 1990 by William Godwin.

YOUNG (1954) reported *P. muticus* from "swamp streams and other situations" and "nearly always associated with *Spirogyra* or other filamentous algae". MATTA (1976) reported *P. muticus* "most often in lentic situations, however it is extremely broad in its environmental tolerance and is likely to be encountered in almost any standing water. It occurs in great numbers in farm ponds."

Peltodytes oppositus Roberts, 1913, has previously been reported from the states shown on Map 1 (BLACKWELDER & ARNETT, JR., 1974; BLATCHLEY, 1917; BRIGHAM, 1982; FOLKERTS, 1978; KIRK, 1970; MATTA, 1976; ROBERTS, 1913; YOUNG, 1954, 1961). One hundred and six specimens of *P. oppositus* were found in Hardin County on the Roy E. Larsen Sandyland Sanctuary, a preserve of The Nature Conservancy of Texas. The beetles were found in a borrow ditch (SS2) created when the adjacent raised railroad track was constructed. They were collected on 18 August 1992 in a pool approximately five meters across. This was the only water remaining in the borrow ditch at the time. The site has been revisited twice. In May of 1993, the ditch was filled with water and consisted of a series of fast-running shallow areas and deeper, slower pooled areas, and substantial amounts of filamentous algae. In October of 1993, the entire ditch was dry. At the time of collection, the pool that remained of the ditch had no emergent vegetation, no filamentous algae, little detritus and a muddy substrate. It was completely open to the sun and was no deeper than 20 cm. The turbidity level was very high at 130 NTU. The pool contained thousands of aquatic beetles that had retreated into this small area as the ditch dried.

Seven specimens of *P. oppositus* were found in a sunny, pooled area of a very slow-moving, spring-fed stream (E19) in San Jacinto County, along with 75 specimens of *P. sexmaculatus* and 27 specimens of *P. dunavani*. This sandy-bottomed stream had little detritus, but about a 30% cover of *Ludwigia* sp. On two occasions, *P. oppositus* was found at a pond (E52) in Tyler County with a sandy bottom covered with a thick layer of detritus from the surrounding shrubs. A small amount of vegetation was present at the margin, mostly

grasses and *Eleocharis* sp., and filamentous algae were present. Available physicochemical data are given in Table 2.

An additional specimen of *P. oppositus* was collected by J. E. Wappes in Montgomery County at light between June 27 and 30, 1977. YOUNG (1954) states that *P. oppositus* is associated with filamentous algae and MATTA (1976) says it "apparently prefers lentic situations where filamentous algae occurs."

Site	Date	Tem	pH	DO	Con	Tur	Alk	# Ind
E19	Dec 19, 1991	12	6.2	7.8	40	12	7	7
E52	Jul 27, 1991	29	5.6	5.9	70	12	43	9
E52	Aug 31, 1991	29	5.8	7.1	50	29	15	5
SS2	Aug 18, 1992	25	5.5	0.8	31	130	3	106

Table 2: *Peltodytes oppositus* Physical-Chemical Data.

● = no data available. Units of measure: = Tem = (temperature) in °C; DO = (dissolved oxygen) in milligrams per liter; Tur = (turbidity) in NTU (nephelometric turbidity units); Con = (conductivity) in μ mhos (micromhos); Alk = (alkalinity) in milligrams per liter of CaCO_3 .

The following specimens initially keyed to *Peltodytes lengi* Roberts, 1913, because they lacked a subhumeral spot. At the Fourth Annual Hydradephagan Meeting, this species was reported as new to Texas. Since that time, the specimens have been examined by Bernhard van Vondel and reassigned to *P. duodecimpunctatus*. He is revising the Nearctic Haliplidae and has decided the subhumeral spot and the angulation of the hind coxal plate are not reliable characters. The male genitalia of these two species are identical. At this time, it is Vondel's opinion that the two species are conspecific (pers. comm.). YOUNG (1961) also noted that the subhumeral spot is sometimes absent in *P. duodecimpunctatus*.

P. lengi has previously been reported from the states shown on Map 1 and the Canadian provinces of Ontario and Quebec (BLACKWELDER & ARNETT, JR., 1974; BRIGHAM, 1982; BRIGHAM & SANDERSON, 1973; FOLKERTS, 1978; HATCH, 1953; HILSENHOFF & BRIGHAM, 1978; KIRK, 1970; MATTA, 1976; ROBERTS, 1913; ROUGHLEY, 1991; STAINES, 1986; WHITE, et al., 1985; YOUNG, 1954). YOUNG (1961) states that his records for *P. lengi* reported in 1954 are actually *P. dietrichi* Young, 1961. Also, the record for the state of Washington (HATCH, 1953) represents a very disjunct distribution and is questionable.

P. duodecimpunctatus has been recorded from the states shown on Map 1 and the Canadian provinces of Ontario and Quebec. (BLACKWELDER & ARNETT, JR., 1974; BLATCHLEY, 1910; BRIGHAM, et al., 1982; CHAGNON & ROBERT, 1962; FOLKERTS, 1978; HILSENHOFF & BRIGHAM, 1978; HOLESKI & GRAVES, 1978; KIRK, 1970; MATHESON, 1912; MATTI, 1976; ROUGHLEY, 1991; SCHAFFNER & JAQUES, 1948; STAINES, 1986; WHITE, et al., 1985). Seventy-three specimens of *P. duodecimpunctatus* were collected, all from streams except one, which was found at a lily pond.

The western-most extension of the range of *P. duodecimpunctatus* in Texas was Grimes County, where two specimens were found. One was found on 15 June 1991 in a small, mud-bottomed stream (E28) with little vegetation and little detritus. The depth was 40 cm or less and the flow was moderate. The site has not been revisited. The other Grimes County specimen was collected in *Spirogyra* sp. in a riffle area over a limestone substrate. Only a few tufts of grass, and no detritus, were present in the riffle area. This stream has been sampled on several occasions and this riffle area is often dry due to low-water conditions. This area of Grimes County is adjacent to the eastern deciduous forest extension into East Texas where the other specimens were found. Physicochemical data for these sites are given in Table 3.

Just east of Grimes County and within the eastern deciduous forest, is Montgomery County. Twenty-two specimens of *P. duodecimpunctatus* were collected on three sampling occasions at a small, sandy-bottomed stream (E23). No macrophytes were present but detritus was heavy. The conductivity level of 300 μ mhos is extraordinary for this stream and might indicate some pollution event.

Further east, in San Jacinto County, a total of thirty-five specimens of *P. duodecimpunctatus* were found at three different sandybottomed streams on eight sampling dates. Winters Bayou (E56) is a large stream about 10 meters across and was sampled where a second stream, about 5 meters across, joined it. No macrophytes and little detritus were present. The San Jacinto River (E57) varied from flood-stage to almost dry. *Hydrolea uniflora* Raf. and *Ludwigia palustris* (L.) Ell. were present along the margins. The amount of detritus present varied considerably with the flowrate and the time of year. Big Creek (E12) maintains a fairly constant level year-round and is about 5 meters across. Small amounts of *Polygonum* sp. and *Ludwigia* sp. were located in a few areas along the margin. Little detrital matter was present due to the constant flow (average 44 cm/sec).

Further east yet, Bluff Creek (E41) in Polk County and Theuvinins Creek (E37) in Tyler County are both sandy-bottomed streams. Sixteen specimens were found in Bluff Creek on 6 September 1992 when no flow was detectable. A single small patch of *Ludwigia palustris* L. was present at the margin. Two specimens of *P. duodecimpunctatus* were collected at Theuvinins Creek. No macrophytes, little detritus, and only a small amount of *Spirogyra* sp. were present. The flowrate was 60 cm/sec.

MATTA (1976) stated that *P. lengi* was "most frequently encountered at the margins of shallow ponds" and *P. duodecimpunctatus* was a "farm pond species". HILSENHOFF and BRIGHAM (1978) noted that all their specimens of *P. duodecimpunctatus* "were collected from margins of streams", supporting the findings of this study.

Site	Date	Tem	pH	DO	Tur	Con	Alk	# Ind
E41	Sep 6, 1992	25	6.1	6	14	52	6	16
E56	Sep 6, 1992	26	7.1	3	7	494	73	14
E23	Jun 15, 1991	23	6.5	4	22	300	●	13
E23	Aug 30, 1991	29	6.2	7.7	12	85	39	7
E12	May 28, 1991	17	6.1	12.8	10	100	●	5
E12	Jun 7, 1992	22	6.5	7.8	22	62	7	5
E37	Dec 19, 1991	11	6.6	10	38	70	10	3
E57	Sep 6, 1992	26	6.9	6	13	377	53	3
E23	Jan 2, 1992	12	6.3	3.1	13	50	14	2
E03	Feb 29, 1992	18	6.2	9.4	49	315	8	1
E10	Aug 31, 1991	29	5.7	4.5	8	44	21	1
E56	Dec 19, 1991	11	7.5	9.3	22	250	73	1
E28	Jun 15, 1991	●	6.4	●	77	●	●	1
E57	Dec 19, 1991	11	7.1	8.6	38	250	44	1

Table 3: *Peltodytes duodecimpunctatus* Physical-Chemical Data.

● = no data available. Units of measure: = Tem = (temperature) in °C; DO = (dissolved oxygen) in milligrams per liter; Tur = (turbidity) in NTU (nephelometric turbidity units); Con = (conductivity) in μ mhos (micromhos); Alk = (alkalinity) in milligrams per liter of CaCO_3 .

P. dispersus Roberts, 1913, has previously only been reported from Arizona, Utah, and California (BLACKWELDER & ARNETT, JR., 1974; ROBERTS, 1913; ZIMMERMANN, 1924). This species is represented by thirty-nine specimens in the collection of the Entomology Department at Texas A&M University. Seventeen specimens are from Shafter, two specimens are from near Hot Springs, and 12 are from the Chinati Mountains, all in Presidio County, Texas. Seven specimens are from Big Bend, Brewster County, Texas. All were identified by Warren U. Brigham in 1971. A single specimen from Faywood County, New Mexico, identified by David Dunavan in 1934, is also in the collection. No habitat data are available in the literature or on the labels.

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