SAPIENZA
UNIVERSITÀ EDITRICE

© Author(s)
E-ISSN 2284-4880
ISSN 0429-288X

CC BY NC SA 4.0 INTERNATIONAL

Fragmenta entomologica, 56 (1): 65–72 (2024)

Research article
Submitted: January 18th, 2024 – *Accepted*: April 30th, 2024 – *Published*: June 30th, 2024
DOI: 10.13133/2284-4880/1573

New distributional records of the genus *Tetragonoderus* Dejean, 1829 from the United States of America, including an updated key to species (Coleoptera: Carabidae)

Alessandra PANDOLFI[1, 2, *], Kyle E. SCHNEPP[3]

[1] *University of Central Florida, Department of Biology - 4110 Libra Dr., Orlando, FL 32816-2368, USA* – pndalessandra@gmail.com
[2] *Broward College Insect Collection - 3501 SW Davie Rd Bldg 7 rm 212, Davie, FL 33314, USA*
[3] *Florida State Collection of Arthropods, Division of Plant Industry - Florida Department of Agriculture and Consumer Services - 1911 SW 34th Street, Gainesville, FL 32608, USA* – keschnepp@gmail.com
*Corresponding author

Abstract
New distributional records are presented for the genus *Tetragonoderus* Dejean, 1829 from the United States of America. *Tetragonoderus fasciatus* (Haldeman, 1843) is a new state record for South Dakota, *Tetragonoderus intersectus* (Germar, 1824) is a new state record for Oklahoma, *Tetragonoderus latipennis* LeConte, 1874 is a new state record for Florida, Georgia, and Okhlaoma, and *Tetragonoderus pallidus* Horn, 1869 is a new state record for New Mexico and Utah. New county records for the introduced species *Tetragonoderus laevigatus* Chaudoir, 1876 in Florida and new state records for Georgia, Louisiana, and Mississippi signify a range extension. A new record of this species from Miami-Dade County from 2004 temporally precedes the known date of introduction. New observational records from citizen science platforms for the reported species are also noted. An updated key and distributional maps to the known species in the USA are also provided.

Keywords: Harpalinae, ground beetle, exotic species, range expansion, citizen science.

Introduction

The tribe Cyclosomini, in the subfamily Harpalinae, contains 118 species in four genera, predominately tropical with most of the species in the Oriental, Afrotropical, and Neotropical regions: *Cyclosomus* Latreille, *Cyclicus* Jeannel, *Mnuphorus* Chaudoir, and *Tetragonoderus* Dejean (Ball & Bousquet 2000; Bousquet 2012). The genus *Tetragonoderus* Dejean, 1829 comprises about 75 species (Lorenz 2005) divided into two subgenera, *Tetragonoderus s.str*. in the Old World and *Crossonychus* for the Western Hemisphere (Bousquet 2012).

Five species are recognized for the USA, four of which are native. These include *Tetragonoderus fasciatus* (Haldeman, 1843), *Tetragonoderus intersectus* (Germar, 1824), *Tetragonoderus latipennis* LeConte, 1874, and *Tetragonoderus pallidus* Horn, 1869. One, *Tetragonoderus laevigatus* Chaudoir, 1876, is introduced from South America and is considered adventive in Southern Florida (Ball & Bousquet 2000; Bousquet 2012).

We herein present new distributional records from the USA for the four native species since Bousquet's (2012) catalog and confirm the presence and range expansion of the introduced species *T. laevigatus* since Shpeley & Ball (2008) first record. With the increased use of citizen science platforms, additional new distributional records for the reported species are also noted as observational data. A key, photos, and distributional maps to the known species in the USA are also provided.

Material and Methods

We gather new distributional records from institutional and private insect collections. All taxa are listed in alphabetical order. Specimen label data is presented when available, and a forward slash is used to distinguish between different labels. The number of specimens bearing the same data are reported in parentheses along with the collection abbreviation.

Additional new distributional records for the reported species were obtained from the Global Biodiversity Information Facility (GBIF). First, the accepted name of the species was entered in the search function. Following this, all the records were filtered based on the country 'United States of America'. Records reported on GBIF are vouchers

present in institutional insect collections (pinned vouchers and DNA extracts) and observational records derived from citizen science platforms. The original sources of information where datasets were found are as follows: NEON Invertebrate Voucher Collection at Arizona State University (NEON 2023a), NEON Carabid Collection (DNA Extracts) (NEON 2023b), NEON Carabid Collection (Pinned Vouchers) (NEON 2023c), NEON Carabid Collection (Trap Sorting) (NEON 2023d), Centre for Biodiversity Genomics (CBG 2023), Essig Museum of Entomology (EMEC 2023), Texas A&M University (TAMU 2023), and the Bean Life Science Museum (BYUC 2023). The observational records are from *iNaturalist* (iNaturalist 2023) and *BugGuide* (BugGuide 2023), and pictures were checked to exclude possible misidentifications. The detailed information of all the GBIF records can be accessed through the reported link and can be found on the public data portal. All new observational records from GBIF are provided along with occurrence ID of the observation. *iNaturalist* and *BugGuide* occurrences can be accessed using the following links where the last part of the URL corresponds with the ID of the observation: https://www.inaturalist.org/observations/149008159 and https://bugguide.net/node/view/2202853.

Images of the five species present in the USA were captured using a Canon Eos 6D Mark II camera mounted to a Nikon SMZ 1500 microscope and maps of distribution were created using ArcGIS Pro 3.2.

Collection abbreviations:
ABSC: Archbold Biological Station Collection (USA)
AMDC: Anthony Martin Deczynski private collection (USA)
APC: Alessandra Pandolfi private collection (USA)
ASU-NEON-IV: NEON Invertebrate Voucher Collection at Arizona State University (USA)
BCIC: Broward College Insect Collection (USA)
BYUC: Bean Life Science Museum (USA)
CBG: Centre for Biodiversity Genomics (Canada)
CUAC: Clemson University Arthropod Collection (USA)
EMEC: Essig Museum of Entomology (USA)
FSCA: Florida State Collection of Arthropods (USA)
KESC: Kyle E. Schnepp private collection (USA)
NEON-CARC-DNA: Carabid Collection (DNA Extracts) (USA)
NEON-CARC-PV: Carabid Collection (Pinned Vouchers) (USA)
NEON-CARC-TS: Carabid Collection (Trap Sorting) (USA)
NMNH: Smithsonian Natural History Museum (USA)
PWMC: Peter W. Messer private collection (USA)
TAMU: Texas A&M University (USA)
UCFC: University of Central Florida Collection of Arthropods (USA)

Results

***Tetragonoderus fasciatus* (Haldeman, 1843)**
(Fig. 1a-b; GBIF Occurrence Download https://doi.org/10.15468/dl.hnymxq)

South Dakota: **Clay**: iNaturalist observations 149008159; 83409895; 87841289; 87840272; BugGuide observation 2202853.

Distribution. Alabama, Arkansas, Arizona, California, Connecticut, District of Columbia, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Louisiana, Massachusetts, Mayland, Maine, Michigan, Minnesota, Missouri, Mississippi, North Carolina, Nebraska, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Vermont, Wisconsin, **new for South Dakota**.

Fig. 1 – *Tetragonoderus fasciatus* (Haldeman, 1843): **a**, map of distribution; **b**, habitus.

***Tetragonodeus intersectus* (Germar, 1824)**
(Fig. 2a-b; GBIF Occurrence Download https://doi.org/10.15468/dl.vhnr27)

Oklahoma: **Marshall**: US OK Marshall Co., U. OK Biological Sta. UVL, 33.52.59.1N, 96.48.05.3W, 7 Jul 2017, M. Quinn (2, PWMC); BugGuide observation 1426676.

Distribution: Alabama, Arkansas, Arizona, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, **new for Oklahoma**.

***Tetragonoderus laevigatus* Chaudoir, 1876**
(Fig. 3a-b; GBIF Occurrence Download https://doi.org/10.15468/dl.ujggsv)

Florida: Alachua: Florida: Alachua Co., San Felasco H.P.S.P., 28 Jun 2023 at light, Kyle E. Schnepp (4, KESC); iNaturalist observation 142857151; **Brevard**: iNaturalist observation 90246871; **Broward**: FL, Broward Co., 26.00.39.6N, 80.16.22.7W, 27 May 2023, J. Fortnash (1, APC); FL, Broward Co., 26.00.39.6N, 80.16.22.7W, 17 Jun 2023, J. Fortnash (3, BCIC; 4 UCFC); iNaturalist observations 212866080; 19785788; 43433420; 104480800; 113628164; 129844204; **Clay**: iNaturalist observation 147437632; **Highlands**: Highlands Co., Lake Placid, Archbold Biological Station, 23 Jun 2011, Mercury Vapor Light, Vince Golia (1, ABSC); Highlands Co., Lake Placid, Archbold Biological Station, 22 Jun 2014, Mercury Vapor Light, Vince Golia (1, ABSC); Highlands Co., Lake Placid, Archbold Biological Station, 23 Jun 2014, Black Light, Vince Golia (1, ABSC); Highlands Co., Lake Placid, Archbold Biological Station, 22 Jun 2014, Mercury Vapor Light, Vince Golia (4, ABSC); Highlands Co., Archbold Biol. Station, 4 Aug 2017, at light, Kyle E. Schnepp (1, KESC); **Hillsborough**: Florida: Hillsborough, Co., Tampa Fair Grnds, 29 Aug 2014, E2014-6141, T. Streeter (1, FSCA); iNaturalist observations 123860479; 86600143; **Lee**: iNaturalist observations 19291019; 19291018; **Manatee**: iNaturalist observation 132670225; **Marion**: Florida: Marion Co., S.R. 40 & F.R. 33, 29 Apr 2017, sifted from sand, Kyle E. Schnepp (1, KESC); **Monroe**: Florida: Monroe Co., Key West, 15 Jun 2010, Sida acuta litter, A. Silagyi & L. Whilby, (2, FSCA); Florida: Monroe Co., Key West, Fort Zackary State Park, 15 Jun 2010, blacklight trap, A. Derkesen & K. Griffiths (1, FSCA); **Orange**: Orange Co.; Orlando, Dr. P. Phillips Community Park, 28.24.30.3N, 81.29.25.2W, 5 Mar 2018 (1, AMDC); Orange Co., Orlando, University of Central Florida, main campus, pollinator garden, 28.35.58.2N 81.11.49.6W, 01-07 Sept 2022, pitfall trap, A. Pandolfi (56, UCFC); iNaturalist observations 27688260; 35396819; BugGuide observations 2276928; 2276926; 1380131; **Osceola**: Osceola Co., St. Cloud, Basecamp Sunbridge, 28.20.02.8N 81.11.22.0W, 10-20 Oct 2022, pitfall trap, A. Pandolfi (3, UCFC); NEONU1377-12; NEONU1378-12; NEONU1379-12; NEONU1380-12; NEONU1381-12; NEONU1382-12; NEONU1420-12 (7, ASU-NEON-IV); **Palm Beach**: BugGuide observation 1147667; **Pasco**: iNaturalist observation 69306635; **Polk**: BETN2377-18; BETN2378-18; BETN2382-18; BETN2383-18; BETN2388-18; BETN2390-18; BETN2392-18; BETN2393-18; BETN2429-18; BETN2430-18; BETN2608-18; BETN2611-18; IUP782-14; BETN8246-20, IUP1045-14 (15, ASU-NEON-IV); NEON03W65; NEON03079; NEON03D50; NEON03D51; NEON03D4O; NEON03D4M; NEON03D4N; NEON03D4I; NEON03D4K; NEON03D4H; NEON03C17; NEON03C16; NEON03BYY; NEON03BYX (14, NEON-CARC-DNA); **Putnam**: BETN5241-19; BETN5277-19 (2, ASU-NEON-IV); NEON03W3G; NEON03W2G (2, NEON-CARC-DNA); **Sarasota**: BBCCA4165-12 (1, CBG); iNaturalist observa-

Fig. 2 – *Tetragonoderus intersectus* (Germar, 1824): **a**, map of distribution; **b**, habitus.

tions 104376884; 124320177; **Seminole**: BugGuide observations 2116445; 2116444; 2020329; 2020328; 2020327; **Volusia**: Volusia Co.; Lighthouse Point Park. N29.078175 W80.922733. 31 Jul 2020 (2, AMDC).

Georgia: **Camden**: iNaturalist observation 103792264.

Louisiana: **Orleans Parish**: iNaturalist observation 236989459.

Mississippi: Harrison: Harrison Co.: Long Beach, 30.20.22.9N 88.10.22.8W, 10 Jun 2023, leg. R. Kergosien (BugGuide observation 744417)

Distribution. Florida, **new for Georgia, Louisiana, and Mississippi**.

Remarks. Florida: Dade Co., Miami, Dolphin Carpet, tile warehouse, 14 Apr 2004, coll. E. Varona (1, FSCA). This record from 2004 precedes the known record of introduction in the USA reported by Shpeley and Ball (2008).

***Tetragonoderus latipennis* LeConte, 1874**

(Fig. 4a-b; GBIF Occurrence Download https://doi.org/10.15468/dl.hy9h4a)

Florida: Santa Rosa: Santa Rosa Co, Blackwater R St. Pk., 3 mi N of Harold, 26 Jun 1981, sandbar (2, FSCA); Santa Rosa Co, Blackwater R St. Pk., 26 Jun 1981, sandbar / blacklight trap on sandbar, P. M. Choate (1, FSCA); Santa Rosa Co, Blackwater R St. Pk., 3.5 mi. N Harold; 16 Jul 1983, P. M. Choate, on sandbar (1, FSCA); Santa Rosa Co., 5.5 mi W. Munson on Rt. 4, 11 Apr 1999, on sand bar, P. Skelley & R. Turnbow (1, FSCA); **Okaloosa**: Okaloosa County, 4.5 MI. N. Holt, Fla, A&M Res. Sta., Blackwater River State Forest / L.A. Stange 17 Jun 1978 (2, FSCA); Okaloosa Co., Blackwater River, Rt. 4, 27 Jun 1981, P.M. Choate Jr. coll. (2, FSCA).

Georgia: **Baker**: USA: Georgia, Baker Co. Ichauway, Flint River, Fourth of July Beach, 31.15.09.0N 84.21.45.4W, 10 May 2022 active at night on sand, C.W. Harden. (1, CUAC000183306, CUAC); iNaturalist observations 118465554; 117491342.

Oklahoma: **Marshall**: X1056307, X1057199, X1057366, X1060429 (4, TAMU); X0915950, X0914474, X0915374 (3, TAMU).

Distribution. Alabama, Arkansas, Arizona, Louisiana, Mississippi, Texas, **new for Florida, Georgia, and Oklahoma**.

***Tetragonoderus pallidus* Horn, 1869**

(Fig. 5a-b; GBIF Occurrence Download https://doi.org/10.15468/dl.ggydvz)

New Mexico: Doña Ana: NEON08ME3, NEON08MEF; NEON08MEG; NEON08MEH; NEON08MEI; NEON08MEJ; NEON08MEK; NEON08ME4; NEON08ME5; NEON08ME6; NEON08ME7; NEON08ME8; NEON08ME9; NEON08MEA; NEON08MEB; NEON08MEC; NEON08MED; NEON08MEE; NEON08EHQ; NEON07MDX; NEON07MDW; NEON07MDV; NEON07MDZ; NEON07MDY; NEON07MDU; NEON07MDT; NEON07MDS; NEON06FSX; NEON05F76; NEON05F77; NEON05F79; NEON05F72; NEON05F71; NEON05F6Z; NEON05F74; NEON05F70; NEON05F5N; NEON05F5O; NEON05F5J; NEON05F5L; NEON05F5K; NEON05F5F; NEON05F5G; NEON05F5M; NEON05F5H; NEON05F5I; NEON05F67; NEON05F68; NEON05F64; NEON05F65; NEON05F66; NEON05F6R; NEON05F6S; NEON05F6T; NEON05F6P; NEON05F6Q; NEON05F6H; NEON05F6I; NEON05F6D; NEON05F6E; NEON05F6F; NEON05F69; NEON05F6A; NEON05F6G; NEON05F6B; NEON05F6C; NEON05EZQ; NEON05EZM; NEON05EZ9; NEON05EZI; NEON05EZF; NEON-

Fig. 3 – *Tetragonoderus laevigatus* Chaudoir, 1876: **a**, map of distribution; **b**, habitus.

05EZA; NEON05EZH; NEON05EZD; NEON05EZC; NEON05EZB; NEON05EZE; NEON05EZ8; NEON05F03; NEON05F00; NEON05EZ4; NEON05EZ6; NEON05EZ7; NEON05EZ0; NEON05EZ3; NEON05EZ1; NEON05EYT; NEON05EZ2; NEON05EYO; NEON03MCT; NEON03MCU; NEON03MCW; NEON03MCV; NEON03MCS; NEON03MCP; NEON03MCR; NEON03MCQ; NEON03M5L; NEON03M5H; NEON03M5I; NEON03M5K; NEON03M5E; NEON03M5J; NEON03M5G; NEON03M5F; NEON03M5A; NEON03M5B; NEON03M5D; NEON03M59; NEON00BA6; NEON00BBS; NEON00BC6; NEON00BAQ; NEON00B9S; NEON00BAH; NEON00BC1; NEON00BBT; NEON00B9U; NEON00BBA; NEON00BAP; NEON00B4C; NEON00BAD; NEON00BBH; NEON00BB2; NEON00B4E; NEON00BBL; NEON00BAB; NEON00BA7; NEON00BA0; NEON00BAC; NEON00B9T; NEON00B4F; NEON00BBR; NEON00B9H; NEON00BAU; NEON00BBK; NEON00B9L; NEON00BAI; NEON00BB5; NEON00BAS; NEON00BBN; NEON00B9D; NEON00BAL; NEON00B9N; NEON00BAA; NEON00B9M; NEON00BBV; NEON00BB9; NEON00BB4; NEON00BC5; NEON00BBG; NEON00B9O; NEON00BBB; NEON00B9I; NEON00BC7; NEON00BAJ; NEON00B4B; NEON00BA8; NEON00BC2; NEON00BAY; NEON00BBM; NEON00BAE; NEON00BB3; NEON00BB1; NEON00BBW; NEON00B4H; NEON00BBJ; NEON00BAM; NEON00BBP; NEON00BAV; NEON00B9K; NEON00BB7; NEON00BBY; NEON00BBX; NEON00BA3; NEON00B9Y; NEON00BAK; NEON00G89; NEON00B9J; NEON00B9P; NEON00BB; NEON00B4D; NEON00B9F; NEON00BAZ; NEON00BBI; NEON00BAX; NEON00B9R; NEON00B4A; NEON00BBE; NEON00BAW; NEON00BB; NEON00BA5; NEON00B4G;-NEON00BA; NEON00BBZ; NEON00B9G (196, NEON-CARC-PV); NEON08A5C; NEON08A5E; NEON08A5F; NEON08A6P; NEON08A6G; NEON08A6H; NEON03ZA3; NEON03ZA5; NEON03ZA6; NEON03ZA7; NEON03ZA8; NEON03ZBR; NEON03Z4I; NEON03Z4J; NEON03Z4K; NEON03Z4L; NEON03Z4M; NEON03Z4N; NEON03Z4T; NEON03Z4S; NEON03Z4H; NEON03Z4U; NEON03Z4V; NEON03Z4R; NEON03Z4O; NEON03Z4Q; NEON03Z4P; NEON03GEV; NEON03GEX; NEON03GEZ; NEON03GF0; NEON03GEY; NEON03GF5; NEON03GF4; NEON03GF2; NEON03GET; NEON03GEU; NEON03GES; NEON03GFB; NEON03GF7; NEON03GFF; NEON03GF6; NEON03GFC; NEON03GFG; NEON03GFA; NEON03GF9; NEON03GFE; NEON03GFD; NEON03GEE (49, NEON-CARC-DNA); NEON031U5; NEON031U1; NEON031U2; NEON031U3; NEON031U6; NEON00W95; NEON00W90; NEON00W9F; NEON00WAW; NEON00W9A; NEON00WAN; NEON00W8S; NEON00W9H; NEON00W9S; NEON00WAR; NEON00W9M; NEON00W9Z; NEON00WAY; NEON00W9Y; NEON00WAQ; NEON00W9; NEON00WA5; NEON00WAE; NEON00W9W; NEON00W9P; NEON00W93; NEON00WAS; NEON00W9D; NEON00W9X; NEON00W99; NEON00WA6; NEON00W9C; NEON00W9B; NEON00W9N; NEON00W9O; NEON00WAT; NEON00WAG; NEON00WA9; NEON00WA8; NEON00WAD; NEON00WA2; NEON00WA3; NEON00WAB; NEON00W8V; NEON00WAO; NEON00W8Z; NEON00W9K; NEON00WAJ; NEON00W97; NEON00WAC; NEON00WAM; NEON00W9R; NEON00WAP; NEON00W91; NEON00WAV; NEON00WAA; NEON00WAH; NEON00W9J; NEON00W94; NEON00WA7; NEON00WA0; NEON00W92; NEON00WAZ; NEON00WA1; NEON00W9G; NEON00W8X; NEON-

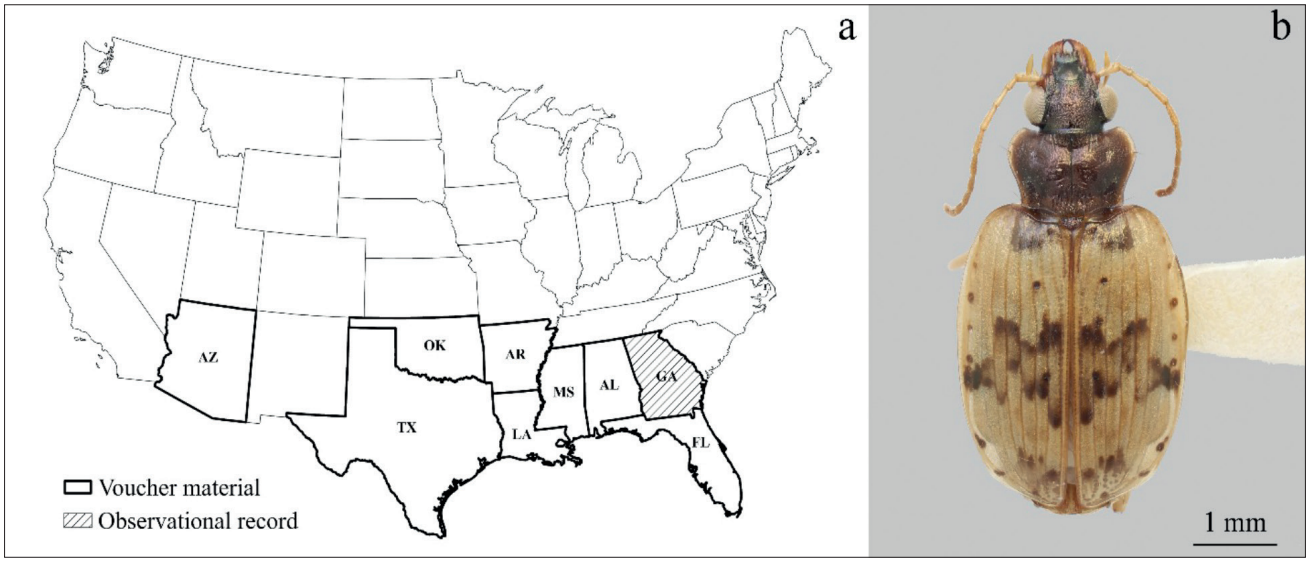

Fig. 4 – *Tetragonoderus latipennis* LeConte, 1874: **a**, map of distribution; **b**, habitus.

00WAL; NEON00WAF; NEON00W9T; NEON00WAX; NEON00W8W; NEON00WA4; NEON00W9I; NEON-00W9V; NEON00W9L; NEON00WAU; NEON00WAI; NEON00WAK; NEON00W9U; NEON00W96; NEON-00W8Y; NEON00W9Q; NEON00W9E; NEON00W8T; NEON00W8U (85, NEON-CARC-TS); EMEC1304567; EMEC1301143; EMEC1304566; EMEC1304572; EMEC1301146; EMEC1304559; EMEC1304584; EMEC1301142; EMEC1304586; EMEC1304578; EMEC1304582; EMEC1304579; EMEC1301153; EMEC1304580; EMEC1304565; EMEC1304561; EMEC1304573; EMEC1301147; EMEC1304564; EMEC1304562; EMEC1304568; EMEC1301155; EMEC1304571; EMEC1304576; EMEC1301154; EMEC1301152; EMEC1304560; EMEC1304569; EMEC1304558; EMEC1301149; EMEC1304570; EMEC1301148; EMEC1304574; EMEC1304583; EMEC1304585; EMEC1304577; EMEC1301144; EMEC1301156; EMEC1301151; EMEC1304563; EMEC1304581; EMEC1304557; EMEC1304575; EMEC1301150; EMEC1301145 (45, EMEC).

Utah: **Garfield**: Garfield Co., Bullfrog Creek area, near Lake Powell, 20-24 Aug 1980 / A. S. Menke, F. D. Parker, Kurt A. Menke (1, NMNH); **Washington**: BYUC193186, BYUC195058, BYUC193484, BYUC193233, BYUC192097, BYUC193648, BYUC195000, BYUC193426, BYUC193712, BYUC193752, BYUC193542, BYUC195229, BYUC195051 (13, BYUC); BugGuide observation 1633709.

Distribution. Arizona, California, Nevada, Texas, **new for New Mexico and Utah**.

Key to *Tetragonoderus* Dejean, 1829 species of the United States of America

Adapted from Lindroth (1969) and Choate (2001).

1. Elytra unicolored; entire body pale, rufo-testaceous .... ***Tetragonoderus pallidus*** Horn
- Bicolored with spotted or maculate elytra; body dark **2**
2. Elytra with 4 spots (two apical and 2 basal), rarely uniformly black; exotic .... ***Tetragonoderus laevigatus*** Chaudoir
- Elytra mottled with brown and pale maculae …….**3**
3. Bicolored elytra, piceous with pale striae present in front of the apex that can appear rudimentary and transverse pale makings that may appear as spots on the basal half of the elytra, elytral disc around suture dark; at least palpi, antennae from 2nd or 3rd segment and apex of tibiae infuscated .... ***Tetragonoderus intersectus*** (Germar)
- Bicolored elytra, mottled with brown about the middle and pale striae present along the entire elytra, elytral disc around suture pale or with pale maculations; legs testaceous, pale brown…**4**
4. Head and prothorax black with a tinge of greenish, shining; prothorax not granulate on center; elytral microsculpture transverse; elytra mottled with brown about the middle and incoherent transverse fascia at middle, dark at the middle basal apically; absence of darker punctures on the 3rd and 8th interstriae; claws serrate internally; 4.5 mm long .... ***Tetragonoderus fasciatus*** (Haldeman)
- Head and prothorax black with a tinge of greenish bronze, opaque; prothorax quite dull, granulate all over; elytral microscultpure isodiametric; elytra mottled with brown about the middle, transverse pale striae, with small dark apical band and a broad basal spot extended a short distance along the suture; some punctures on the 3rd and 8th interstriae are darker; claws smooth; 5–6 mm long .... ***Tetragonoderus latipennis*** LeConte

Fig. 5 – *Tetragonoderus pallidus* Horn, 1869: **a**, map of distribution; **b**, habitus.

Discussion

Tetragonoderus fasciatus (Haldeman, 1843) is newly recorded for South Dakota; *Tetragonoderus intersectus* (Germar, 1824) is newly recorded for Oklahoma; *Tetragonoderus latipennis* LeConte, 1874 is newly recorded for Florida, Georgia, and Oklahoma; and *Tetragonoderus pallidus* Horn, 1869 is newly recorded for New Mexico and Utah. The introduced *Tetragonoderus laevigatus* Chaudoir, 1876 is confirmed to be present and well-established in Florida, with an increased expansion range to the central and northern parts of the state. Observational data suggests new state records for Georgia, Louisiana, and Mississippi.

The habitat preference of these beetles is various. They can be found from riparian conditions concealed in leaf litter (Choate & Rogers 1976), to open sand or in grassy areas (Bousquet 2000; Shpeley & Ball 2008). *T. fasciatus* has been observed not only under debris but also over the surface of the soil among plants, feeding upon the leaves of black nightshade *Solanum nigrum* (Everly 1938). It has also been found on corn foliage and in a farm field adjacent to a flood plain forest (Lesiewicz et al. 1982; Vispo et al. 2018). *T. pallidus* has been collected in the burrows of desert rodents (Hubbard 1901). Records from Argentina of the introduced species *T. laevigatus* define it as xerophytic or subxerophytic (Cicchino & Storti 2007), and present in agroecosystems with both no-tillage and conventional tillage systems (Cividanes et al. 2016; Cividanes et al. 2018). In Bolivia, specimens were found in sand pits, among the roots of dead plants, as well as in the leaf litter of a tropical transition forest (Shpeley & Ball 2000). In Florida, one specimen from Miami-Dade County was taken on *Datura* (Solanaceae), while others were found in sandy and grassy residential spaces (Shpeley & Ball 2008). Recent specimens collected in Broward County were found in a sandy yard dirt with dead plant matter and some common weeds (J. Fortnash personal communication). The specimens collected by the first author in Central Florida (Orange County and Osceola County) were found in gardens planted with native plants and one site, Basecamp Sunbridge, had recent plots treated with compost amendments. Based on the information we have today, this species entered Florida probably through commerce, with subsequent dispersal by flight and is not considered invasive as it is not threatening native species (Shpeley & Ball 2008; Bousquet 2012).

Distributional records contribute to the advancement of our understanding of species ranges in a geographic region and their ecology and habitat preference. Citizen science platforms hold immense potential as tools for the global detection and monitoring of species. Cities are key points of entry for many exotic species, and a source of subsequent release or escape into surrounding landscapes (e.g., Padayachee et al. 2017), posing a severe threat to native communities and can cause serious ecological and economic consequences. As such, detection of their presence by citizen participation could highly increase the spatiotemporal coverage for their monitoring. Our work demonstrates the utilization of these resources to revise the distribution of both native species and the introduced species *T. laevigatus*, confirming its successful establishment and ongoing expansion.

To further bolster new distributional records, it's advisable to validate human-reported observations by depositing voucher specimens in either public or private collections. This practice acts as a safeguard against potential taxonomic inaccuracies, enabling future researchers to verify and build upon the initial observations.

Acknowledgments – We thank Mark Deyrup for allowing the study of material deposited in the ABSC, Sandor Kelly for material deposited in the UCFC, Charyn Micheli and Torsten Dikow for material deposited in the NMNH, Curt Harden for material deposited in the CUAC, Anthony Deczynski for material deposited in his private collection (AMDC), Peter W. Messer for material deposited in his private collection (PWMC), Jade Fortnash and David Serrano (BCIC) for reporting the species on iNaturalist and subsequent depositing of voucher specimens in the BCIC, Andrew Johnston (ASU) for his comments on GBIF records, and Patrick Bohlen (UCF) for economic and academic support facilitating fieldwork at Sunbridge (Osceola Co., St. Cloud). We also want to thank all the citizen scientists who contribute with their observations in advancing our understanding of species distributions.

References

Ball G.E., Bousquet Y. 2000. Carabidae Latreille, 1810, pp. 32–132. In Arnett R.H., Thomas M.C. (eds). American Beetles. Volume 1. Archostemata, Myxophaga, Adephaga, Polyphaga: Staphyliniformia. CRC Press, New York, NY.

Bousquet Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. ZooKeys, 245: 1–1630.

BYUAC 2023. Brigham Young University Arthropod Museum. Occurrence dataset https://doi.org/10.15468/gqf6no accessed via GBIF.org on 2023-08-19.

BugGuide 2023. BugGuide - Identification, Images, & Information For Insects, Spiders & Their Kin For the United States & Canada. Version 1.5. United States Geological Survey. Occurrence dataset https://doi.org/10.15468/sk2lxk accessed via GBIF.org on 2023-08-19.

CBG 2023. Centre for Biodiversity Genomics. Occurrence dataset https://scientific-collections.gbif.org/institution/0360f257-7121-45f1-8947-14a3600e56af accessed via GBIF.org on 2023-08-19.

Choate P.M. 2001. Manual for the identification of Ground beetles (Coleoptera: Carabidae) (including tiger beetles) of Florida. Department Entomology and Nematology University of Florida.

Choate P.M., Rogers T. 1976. The occurrence of a troglophilic ground beetle in Florida (Coleoptera: Carabidae). The

Coleopterists Bulletin, 30: 364.
Cicchino A.C., Storti C. 2007. Riqueza espcífica de los carábidos (Insecta, Coleoptera) de los suelos del Partido de Saladillo, Provincia de Buenos Aires, Argentina. Resultados preliminares. VI Encuentro Nacional Científico Técnico de Biología del Suelo y IV Encuentro sobre Fijación Biológica del Nitrógeno, Libro de Resúmenes, A4 005: 1–14.
Cividanes F.J., dos Santos-Cividanes T.M., Barbosa J. C. 2016. Seasonal activity of Carabidae (Coleoptera) in forest fragments and crops in São Paulo, Brazil. Coleopterists Bulletin, 70: 638–644.
Cividanes F.J., dos Santos-Cividanes T.M., Ferraudo A.S., da Matta D.H. 2018. Edge effects on carabid beetles (Coleoptera: Carabidae) between forest fragments and agricultural fields in southeast Brazil. Austral Entomology, 57: 9–16.
EMEC 2023. Essig Museum of Entomology. Version 121.308. Berkeley Natural History Museums. Occurrence dataset https://doi.org/10.15468/0saucj accessed via GBIF.org on 2023-08-19.
Esri 2023. ArcGIS 3.2. Redlands, CA: Environmental Systems Research Institute.
Everly R.T. 1938. Spiders and insects found associated with sweet corn with notes on the food and habits of some species. I, Arachnida and Coleoptera. The Ohio Journal of Science, v38 n3: 136–148.
GBIF.org (19 August 2023) GBIF Occurrence Download for *T. laevigatus* https://doi.org/10.15468/dl.ujggsv
GBIF.org (19 August 2023) GBIF Occurrence Download for *T. latipennis* https://doi.org/10.15468/dl.hy9h4a
GBIF.org (19 August 2023) GBIF Occurrence Download for *T. pallidus* https://doi.org/10.15468/dl.ggydvz
GBIF.org (19 August 2023) GBIF Occurrence Download for *T. intersectus* https://doi.org/10.15468/dl.vhnr27
GBIF.org (20 August 2023) GBIF Occurrence Download for *T. fasciatus* https://doi.org/10.15468/dl.hnymxq
Hubbard H.G. 1901. Letters from the Southwest. Insect fauna in the burrows of desert rodents. Proceedings of the Entomological Society of Washington: 361–364.
iNaturalist 2023. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2023-08-19.
Lesiewicz D.S., Van Duyn J.W., Bradley Jr. J.R. 1982. Foliar Carabids of Field Corn in Northeastern North Carolina. The Coleopterists Bulletin: 162–165.
Lindroth CH. 1969. The ground-beetles (Carabidae, excl. Cicindelinae) of Canada and Alaska. Part 6. Opuscula Entomologica Supplementum No. 34: 945–1192
Lorenz W. 2005. Systematic list of extant ground beetles of the world (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae). Titzing [Germany], ii + 530 pp.
NEON 2023a. NEON Invertebrate Voucher Collection at Arizona State University. Occurrence dataset https://doi.org/10.15468/vn96gr accessed via GBIF.org on 2023-08-19.
NEON 2023b. NEON Biorepository Carabid Collection (DNA Extracts). Occurrence dataset https://doi.org/10.15468/smm5vp accessed via GBIF.org on 2023-08-19.
NEON 2023c. NEON Biorepository Carabid Collection (Pinned Vouchers). Occurrence dataset https://doi.org/10.15468/zyx3fn accessed via GBIF.org on 2023-08-19.
NEON 2023d. NEON Biorepository Carabid Collection (Trap Sorting). Occurrence dataset https://doi.org/10.15468/mjtykf accessed via GBIF.org on 2023-08-19.
Padayachee A.L., Irlich U.M., Faulkner K.T., Gaertner M., Procheş Ş. Wilson J.R., Rouget M. 2017. How do invasive species travel to and through urban environments? Biological invasions, 19: 3557–3570.
Shpeley, D., Ball G.E. 2008. Taxonomic review of the Neotropical *Tetragonoderus quadriguttatus* assemblage (Coleoptera: Carabidae: Cyclosomini) with description of *T. deuvei*, new species, and new West Indian and Nearctic locality records. Insecta Mundi, 50: 1–16.
TAMU 2023. Texas A&M University Insect Collection. Occurrence dataset https://doi.org/10.15468/caprqh accessed via GBIF.org on 2023-08-19.
Vispo C., Knab-Vispo C., Cipkowski D., Meyer J., Henrie L. 2018. The Unseen Farm: A Contribution to Mid-Hudson Valley Farmscape Ecology. Page Hawthorne Valley Farmscape Ecology Program Report.