

An Annotated and updated Species List of the Coccinellidae (Coleoptera) of South Dakota

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AN ANNOTATED AND UPDATED SPECIES LIST OF THE COCCINELLIDAE
(COLEOPTERA) OF SOUTH DAKOTA

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Abstract

An updated list of 79 species of Coccinellidae for South Dakota is presented. The list represents a net increase in the state coccinellid fauna from a previously published list of 66 species and subspecific taxa, and it also includes nomenclatural updates. Thirteen species have been added to the list as new state records: *Didion punctatum* (Melsheimer), *Didion nanum* (LeConte), *Scymnus paracanus linearis* Gordon, *Scymnus fraternus* LeConte, *Hyperaspis inflexa* Casey, *Hyperaspis lugubris* (Randall), *Hyperaspis troglodytes* Mulsant, *Hyperaspis brunnescens* Dobzhansky, *Hyperaspis quadrivittata* LeConte, *Brachiacantha decempustulata* (Melsheimer), *Brumoides septentrionis septentrionis* (Weise), *Hippodamia expurgata* Casey, and *Hippodamia sinuata crotchi* Casey. Two specimens of *Coccinella septempunctata* L., collected in 1978 represent a new state record of this species from South Dakota. Eight other species were added after reviewing previously published species records and faunal distribution maps. Several entries were deleted from the list based on synonymies. Four others were deleted because of dubious collection records, and one because of misidentification. Comments on recent collection records for adventive and declining native species of coccinellids are also presented. One *C. transversoguttata richardsoni* Brown from 2006 represents the only known specimen of this species curated since 1979, and one of a few individuals recorded in South Dakota since abundance declined after establishment of *C. septempunctata*.

The Coccinellidae (Coleoptera) comprise a relatively large family of beetles that consists mainly of arthropod predators, but also include phytophagous and mycetophagous species (Vandenberg 2002a). At least 57 genera and 475 species of Coccinellidae are known from America north of Mexico (Gordon 1985). Kirk and Balsbaugh (1975) listed 66 species and subspecies of Coccinellidae for South Dakota. We have been monitoring coccinellid populations in South Dakota, and since 1975 at least two exotic species (*Coccinella septempunctata* L. and *Harmonia axyridis* (Pallas)) and one North American species (*Scymnus kansanus* Casey) have established in South Dakota (Kieckhefer *et al.* 1992; Elliott *et al.* 1996; Hesler *et al.* 2001; Hesler and Kieckhefer 2008).

Since 1975, major systematic works on North American Coccinellidae have also been published, including Gordon (1976), Gordon (1985), and Vandenberg (2002a, b). These papers revised systematics, produced nomenclatural changes, and increased knowledge of the geographical distribution of North American coccinellids, including those in South Dakota. Thus, an updated species list is needed to reflect those changes that affect South Dakota coccinellids.

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Several species of Coccinellidae are increasingly viewed as a focus of conservation efforts (Obrycki *et al.* 2000; Harmon *et al.* 2007). For instance, the establishment of *C. septempunctata* was associated with the decline of two, previously common native coccinellids, *Adalia bipunctata* L. and *C. transversoguttata richardsoni* Brown, in crop fields in eastern South Dakota (Elliott *et al.* 1996). A third native species, *C. novemnotata* Herbst, a generalist once common in various habitats, has declined over much of its historic range (Wheeler and Hoebeke 1995; Harmon *et al.* 2007), including South Dakota (Hesler *et al.* 2004, 2005; Hesler and Kieckhefer 2008). A first step in species conservation is establishing a current inventory of the fauna of interest (McCorquodale and Bondrup-Nielsen 2004), and it is a critical step in assessing species losses and gains and for developing causal hypotheses (Brodman *et al.* 2002). The objectives of this paper are to provide an updated species list to serve as a baseline for future biomonitoring of coccinellids in South Dakota, to review collection records particularly for *C. transversoguttata richardsoni*, *C. novemnotata*, and *A. bipunctata*, and to present analysis and discussion about recent changes in the coccinellid fauna of South Dakota.

Materials and Methods

A revised list of the Coccinellidae of South Dakota was generated by reviewing the relevant literature on Coccinellidae and by examining several collections containing Coccinellidae. The literature reviewed included a list of South Dakota beetles (Kirk and Balsbaugh 1975), distributional and systematics information for North American Coccinellidae (Gordon 1985), and new species records of Coccinellidae for South Dakota (Elliott *et al.* 1996; Hesler *et al.* 2001; Hesler and Kieckhefer 2008). In addition, specimens in five institutional collections were examined including the Severin-McDaniel Insect Research Collection (SDSU), North Dakota Insect Research Collection (NDSU), Iowa State Insect Collection (ISU), Pittsburg (Kansas) State University entomology collection, and a collection at the USDA-ARS North Central Agricultural Research Laboratory (NCARL). Additional specimens were examined in one of the authors (RWK) personal collection and another, relatively small collection (<100 specimens) of South Dakota coccinellids maintained by a colleague. Altogether, about 7,500 specimens were reviewed. Collection records for *C. transversoguttata richardsoni*, *C. novemnotata*, and *A. bipunctata* were examined to determine some of the most recent collection records for these declining species.

Results

The updated list below contains 79 species of coccinellids, a net increase over the 66 specific and subspecific taxa listed by Kirk and Balsbaugh (1975). This net increase results from 12 new state records, 10 additions based on recently published collection records and distribution maps, three deletions based on inconsistencies with known geographic distributions in Gordon (1985), five deletions from synonymies, and one deletion arising from invalid use of a subspecies designation. Six species have undergone changes in names of genus, species, or both. The updated list also incorporates corrected spellings and one corrected author designation.

Additions to the list of South Dakota Coccinellidae. Eight species were added to the South Dakota list based on previously published collection records: *Scymnus coniferarum* (Crotch) (Gordon 1976), *Scymnus kansanus* Casey (Hesler and

Kieckhefer 2008), *Scymnus garlandicus* Casey (Gordon 1976), *Scymnus ardelio* Horn (Gordon 1985), *Diomus debilis* (LeConte) (Gordon 1976), *Brachiacantha uteella* Casey (Gordon 1985), *Coccinella septempunctata* L. (Elliott *et al.* 1996), and *Harmonia axyridis* (Pallas) (Hesler *et al.* 2001). In addition, *Delphastus pusillus* (LeConte) and *Myzia pullata* (Say) were added to the list because they have widespread distributions that respectively include part or all of South Dakota (Gordon 1985).

Several species were added after being identified among previously unsorted and unidentified specimens. *Didion punctatum* (Melsheimer), *D. nanum* (LeConte), *Scymnus paracanus linearis* Gordon, *S. fraternus* LeConte, *Hyperaspis lugubris* (Randall), *H. inflexa* Casey, *H. brunescens* Dobzhansky, and *H. quadrivittata* LeConte were identified during review of unsorted collection material. Specimens of *Brachiacantha decempustulata* (Melsheimer), *Brumoides septentrionis septentrionis* (Weise), *Hippodamia expurgata* Casey and *H. sinuata crotchi* Casey had been identified and sorted by the time of the present study, but were not listed by Kirk and Balsbaugh (1975). A specimen of *Hyperaspis troglodytes* Mulsant was misidentified and had been listed as *H. disconotata disconotata* Mulsant (Kirk and Balsbaugh 1975).

Deletions from previously published lists of South Dakota Coccinellidae. Several species were deleted from the South Dakota faunal list due to synonymy. *Calvia quatuordecimguttata* (L.) is the senior synonym for both *Anisocalvia quatuordecimguttata* (L.) and *Anisocalvia duodecimaculata* (Gebler). *Adalia bipunctata* is the senior synonym of *Adalia frigida* (Gordon 1985). *Anatis labiculata* (Say) is the senior synonym of *Anatis quindecimpunctata* (Olivier) and *A. quindecimpunctata caseyi* Westcott (Gordon 1985). *Olla v-nigrum* (Mulsant) is the senior synonym for *Olla abdominalis* (and *Olla abdominalis plagiata*) (Gordon 1985).

Four species were deleted from the South Dakota list because of dubious collection records. Locality labels of South Dakota for *Scymnus horni* Gorham, *Hyperaspis quadrioculata fidelis* Casey, *H. wickhami* Casey (*H. centralis wickhami* Casey in Kirk and Balsbaugh (1975)), and *Cycloneda sanguinea* (L.) are inconsistent with known geographic distributions of these taxa, which are each limited to the southern U.S. (Gordon 1985).

Coleomegilla maculata maculata (DeGeer) does not occur in North America north of Mexico (Gordon 1985). It was misapplied to some specimens of *C. maculata lengi* Timberlake collected in South Dakota (Kirk and Balsbaugh 1975), but *lengi* is the only subspecies of *maculata* known in the state (Gordon 1985). Krafstur and Obrycki (2000) and Perez and Hoy (2002) recently questioned subspecific designations in *Coleomegilla maculata* DeGeer, but the trinomial nomenclature is retained in the updated list based on Gordon (1985), which provides the most recent systematic treatment of this species.

Nomenclature. *Brachiacantha* Dejean is used rather than the unjustified emendation *Brachyacantha* (Gordon, 1985). Names misspelled in Kirk and Balsbaugh (1975) were corrected in the updated list. Parentheses have been applied to the authorship of *Nephus flavifrons* (Melsheimer) to properly indicate the transfer of this species from *Scymnus* Kugelann by Gordon (1976).

Most recent records of declining species. Only one specimen of *Coccinella transversoguttata richardsoni* collected since 1979 in South Dakota was found among the collections. It was collected from a soybean field on 31 July 2006. Only seven specimens of *Adalia bipunctata* collected since 1967 in South Dakota were found among the collections. Of these, five were collected in western South Dakota from 2004 through 2006, and two were collected on 11 July 1994 and 14

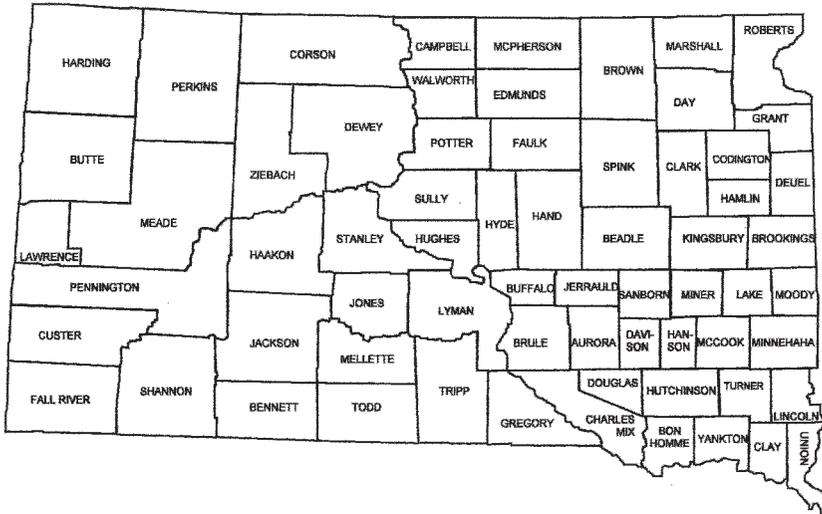


Fig. 1. The counties of South Dakota.

October 1999 from eastern South Dakota (Brookings County) (Hesler and Kieckhefer 2008). A specimen of *C. novemnotata* collected 24 June 1977 from Gary, Deuel County, South Dakota, is the latest record of this species found among the collections.

Annotated checklist. Following is an annotated checklist of the Coccinellidae of South Dakota. Species are listed in the systematic order that was used by Gordon (1985). Distribution information is presented by county based on collection records and the cited literature. A map of the counties of South Dakota is shown in Fig. 1. New state records are indicated in bold capital letters and collection data are given.

The Coccinellidae of South Dakota

Subfamily Sticholotidinae Weise

Tribe Microweiseini Leng

Microweisea misella (LeConte). Brookings, Lawrence, Union (SDSU; Kirk and Balsbaugh 1975; Gordon 1985:43, statewide).

Tribe Serangiini Pope

Delphastus pusillus (LeConte). Extreme southeastern part of state (Gordon 1985:65). No specimens found in collections, and no specific county records found.

Subfamily Scymninae Mulsant

Tribe Stethorini Dobzhansky

Stethorus punctum (LeConte). Brookings, Brule, Butte, Clay, Custer, Grant, Harding, Hughes, Roberts, Stanley, Union (NCARL; SDSU; Kirk and Balsbaugh 1975 and Gordon 1985:99, statewide).

Tribe Scymnini Mulsant

Didion punctatum (Melsheimer). Brule County, Chamberlain, 17-VII-1948, H. C. Severin, male (SDSU). **NEW STATE RECORD**. Gordon 1985:110, statewide).

Didion nanum (LeConte). Haakon County, Philip, 7-VIII-1948, H. C. Severin, female (SDSU). **NEW STATE RECORD**. *Didion nanum* is known from Iowa and the east-central United States (Gordon 1985).

Scymnus americanus Mulsant. Brookings, Jackson, Lake, Yankton (NDSU, SDSU; Kirk and Balsbaugh 1975).

Scymnus apicanus apicanus J. Chapin. Lawrence, Lincoln (SDSU; Kirk and Balsbaugh 1975).

Scymnus paracanus linearis Gordon. Shannon County, Manderson, 3-VIII-1940, L. K. Brunn, male (SDSU). **NEW STATE RECORD**. This subspecies is recorded from various areas in western North America (Gordon 1976).

Scymnus coniferarum (Crotch). Fall River (Gordon 1976:69).

Scymnus kansanus Casey. Brookings (NCARL; Hesler and Kieckhefer 2008).

Scymnus rubricaudus Casey. Brookings, Union (NCARL, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:101).

Scymnus fraternus LeConte. Lincoln County, Newton Hills State Park, 14-VIII-1967, E. U. Balsbaugh, Jr., male (SDSU). **NEW STATE RECORD**. Minnehaha County, 3-VIII-1973, male; 18-VIII-1973, 2 females; 3-VI-1974, male; 27-VIII-1974, male (SDSU). *Scymnus fraternus* is known from much of the eastern two-thirds of North America (Gordon 1976:114; 1985:185).

Scymnus postpictus Casey. Brookings, Butte, Haakon, Harding, Hughes, Hyde, Meade (NCARL, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:132; Hesler and Kieckhefer 2008).

Scymnus garlandicus Casey. Fall River (Gordon 1976:147).

Scymnus iowensis Casey. Brookings, Buffalo, Lawrence, Union (NCARL, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:328; Hesler and Kieckhefer 2008).

Scymnus ardelio Horn. Jackson (Gordon 1976:179).

Scymnus consobrinus LeConte. Roberts (SDSU; Kirk and Balsbaugh 1975; Gordon 1976:192).

Scymnus compar Casey. Brookings, Buffalo, Gregory (NCARL, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:206; Hesler and Kieckhefer 2008).

Scymnus uteanus Casey. Sanborn (SDSU; Kirk and Balsbaugh 1975; Gordon 1976:230).

Scymnus lacustris LeConte. Brookings, Butte, Harding, Hyde, Jackson, Lawrence, Roberts (SDSU, NCARL; Kirk and Balsbaugh 1975; Hesler and Kieckhefer 2008).

Scymnus caudalis LeConte. Clay, Lawrence, Roberts, Union (SDSU; Kirk and Balsbaugh 1975; Gordon 1976:259).

Scymnus brullei Mulsant. Brookings, Butte, Clay, Harding, Hyde, Jackson, Lawrence, Pennington, Shannon, Yankton (NCARL, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:273; Hesler and Kieckhefer 2008).

Nephus flavifrons (Melsheimer). Bon Homme, Clay (SDSU; Kirk and Balsbaugh 1975; Gordon 1976:294).

Nephus intrusus (Horn). Beadle, Brookings, Corson, Hughes, Jackson (NDSU, SDSU; Kirk and Balsbaugh 1975; Gordon 1976:314).

Diomus amabilis LeConte. Brule, Shannon (SDSU; Kirk and Balsbaugh 1975; Gordon 1976:328).

Diomus debilis (LeConte). Jackson (SDSU; Gordon 1976:358).

Tribe Hyperaspidini Mulsant

Hyperaspidius vittigerus (LeConte). Brookings, Butte, Brule, Charles Mix, Harding, Harding, Hughes, Jackson, Lake, Lawrence, Lyman, Meade, Sanborn, Turner, Yankton (SDSU, R.W.K.; Kirk and Balsbaugh 1975; Gordon 1985:320).

Hyperaspis proba (Say). Bon Homme, Brookings, Day, Grant, Roberts, Union (SDSU; Kirk and Balsbaugh 1975; Gordon 1985:416).

Hyperaspis signata (Olivier). Union (Kirk and Balsbaugh 1975).

Hyperaspis binotata (Say). Brookings, Deuel, Grant, Hamlin, Lake, Roberts, Pennington, Yankton (NCARL, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:425).

Hyperaspis bigeminata (Randall). Harding (Kirk and Balsbaugh 1975).

Hyperaspis lugubris (Randall). Lawrence County, Rough Lock Falls, 10-VI-1971, E. U. Balsbaugh, Jr. (SDSU). **NEW STATE RECORD.** There are records of *H. lugubris* from several states in the central United States (Gordon 1985:488).

Hyperaspis lateralis Mulsant. Corson, Grant, Harding, Hyde, Lawrence, Shannon (NDSU; SDSU; Kirk and Balsbaugh 1975 as *Hyperaspis lateralis flammula*).

Hyperaspis fastidiosa fastidiosa Casey. Buffalo, Harding (NDSU; Kirk and Balsbaugh 1975).

Hyperaspis fimbriolata Melsheimer. Deuel, Harding, Hughes, Turner, Yankton (NDSU, R.W.K.; Kirk and Balsbaugh 1975 as *Hyperaspis fimbriolata fimbriolata* Melsheimer).

Hyperaspis inflexa Casey. Butte County, Nisland, 16-VIII-1950, H. C. Severin, female (SDSU). **NEW STATE RECORD.** Lawrence County, 5-VIII-1969 (NDSU); Deuel County, "Coteau Prairie," 19-VII-1979 (NCARL). *Hyperaspis inflexa* is widely distributed in the United States and Canada (Gordon 1985).

Hyperaspis troglodytes Mulsant. Lawrence County, Spearfish Canyon, 4-VIII-1958, H. C. Severin, male (SDSU), and Aurora Prairie, Brookings County, 4-VII-1991, R.W. Kieckhefer, male (R.W.K.). **NEW STATE RECORD.** The specimen was in the SDSU collection and had been identified as *H. disconotata disconotata* Mulsant (Kirk and Balsbaugh 1975). The two species have been considered synonymous by some authors, but Gordon (1985) found sufficient differences in external morphology and between male genitalia to assign them as separate species. Thus, the new species determination deletes *H. d. disconotata* from the state list of Kirk and Balsbaugh (1975). *Hyperaspis troglodytes* is known from Minnesota, Iowa and other locations east of South Dakota. This species is so rare in collections that the possible range cannot be adequately assessed (Gordon 1985), but the first specimen cited above represents perhaps one of the westernmost records.

Hyperaspis undulata (Say). Bon Homme, Brookings, Brown, Buffalo, Clay, Deuel, Grant, Gregory, Hyde, Kingsbury, Lawrence, Lincoln, Minnehaha, Roberts, Turner, Union, Yankton (ISUI, NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975).

Hyperaspis brunnescens Dobzhansky. Moody County, Sioux Prairie, 9-VII-1979, W. D. Wiesenborn, female (NCARL). **NEW STATE RECORD.** This species is known from Iowa, Illinois, Minnesota, and Nova Scotia (Gordon 1985:542; Fauske *et al.* 2003; Majka *et al.* 2007).

Hyperaspis quadrivittata LeConte. Jackson County, Kadoka, "Badlands," H. C. Severin, 3 males, 19-VII-1950 (SDSU). **NEW STATE RECORD.** Several specimens collected thereafter from Brookings, Grant, Jackson, Turner, Yankton

(NDSU, SDSU, R.W.K.). This species is distributed in North Dakota and western states (Gordon 1985:542; Fauske *et al.* 2003).

Tribe Brachiacanthini Mulsant

Brachiacantha tau LeConte. Brookings, Fall River, Hyde, Pennington (NCARL, NDSU, SDSU; Kirk and Balsbaugh 1975).

Brachiacantha decempustulata (Melsheimer). Brookings County, Brookings, 28-VI-1965, V. M. Kirk, two specimens of undetermined gender (NDSU). **NEW STATE RECORD.** Lawrence County, Spearfish, 5-VIII-1969; Buffalo, Ft. Thompson, 23-VII-1969; Union County, Elk Point, 14-VII-1967; (all NDSU). This species is distributed in North Dakota and in eastern states (Gordon 1985; Fauske *et al.* 2003).

Brachiacantha ursina (F.). Bon Homme, Brookings, Clay, Davison, Deuel, Grant, Hamlin, Hughes, Lake, Lawrence, Lincoln, Minnehaha, Sanborn, Spink, Turner, Union, Yankton (ISUI, NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:582).

Brachiacantha uteella Casey. Mellette, Shannon (Gordon 1985:582–584).

Brachiacantha albifrons (Say). Brookings, Brule, Butte, Deuel, Douglas, Fall River, Grant, Gregory, Haakon, Hamlin, Hand, Harding, Hughes, Hyde, Jackson, Kingsbury, Lawrence, McPherson, Meade, Pennington, Roberts, Shannon, Todd (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975).

Subfamily Chilacorinae Mulsant

Tribe Chilacorini Mulsant

Brumoides septentrionis septentrionis (Weise). Butte County, Orman Dam, 2-VIII-1967, E. U. Balsbaugh, Jr., female (NDSU). **NEW STATE RECORD.** (Gordon 1985:607, statewide).

Exochomus aethiops (Bland). Custer, Haakon, Harding, Pennington (SDSU; Kirk and Balsbaugh 1975 as *Brumus aethiops* (Bland); Gordon 1985:633).

Chilacorinus stigma Say. Bon Homme, Brookings, Fall River, Hamlin, Lake, Minnehaha, Shannon, Turner (NCARL, SDSU, R.W.K.; Gordon 1985:651, statewide).

Subfamily Coccidulinae Mulsant

Tribe Coccidulini Mulsant

Coccidula lepida LeConte. Beadle, Deuel, Pennington (SDSU; Kirk and Balsbaugh 1975; Gordon 1985:658, statewide).

Subfamily Coccinellinae Latreille

Tribe Coccinellini Latreille

Anisosticta bitriangularis Say. Brookings, Hamlin, Jones, Kingsbury, Roberts, Turner (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975; Gordon 1985:685, statewide).

Macronaemia episcopalis (Kirby). Brookings, Hamlin, Hand, Harding, Kingsbury, Lawrence, Turner, Yankton (NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975; Gordon 1985:689, statewide).

Paranaemia vittigera (Mannerheim). Brule, Butte, Hyde, Martin (SDSU; Kirk and Balsbaugh 1975, as *Coleomegilla vittigera*).

Coleomegilla maculata lengi Timberlake. Bon Homme, Brookings, Brule, Clay, Davison, Grant, Hutchinson, Lincoln, Minnehaha, Stanley, Union, Yankton (NCARL, NDSU, SDSU; Kirk and Balsbaugh 1975, as *Coleomegilla maculata lengii* and *C. maculata maculata* (Degeer)).

Hippodamia tredecimpunctata tibialis (Say). Aurora, Bennett, Bon Homme, Brookings, Brown, Brule, Buffalo, Butte, Clark, Clay, Custer, Davison, Day, Deuel, Grant, Haakon, Hamlin, Harding, Hughes, Hutchinson, Hyde, Jackson, Kingsbury, Lincoln, Marshall, McCook, McPherson, Minnehaha, Moody, Pennington, Roberts, Stanley, Turner, Union, Yankton, Ziebach (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:711, statewide).

Hippodamia parentesis (Say). Aurora, Beadle, Bennett, Bon Homme, Brookings, Brown, Brule, Buffalo, Butte, Clay, Corson, Custer, Day, Dewey, Fall River, Grant, Gregory, Haakon, Hamlin, Hand, Harding, Hughes, Hutchinson, Hyde, Jackson, Jones, Kingsbury, Lake, Lincoln, Marshall, McCook, McPherson, Meade, Mellette, Miner, Minnehaha, Moody, Pennington, Roberts, Stanley, Todd, Tripp, Turner, Union, Walworth, Yankton, Ziebach (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:718, statewide).

Hippodamia expurgata Casey. Lawrence County, Spearfish, 15-VI-1958, H. C. Severin, two males, 12 females, one undetermined gender (SDSU). **NEW STATE RECORD.** Harding County, North Cave Hills, 6-VIII-1969, female (SDSU). Gordon (1985:725) shows this species to have distribution over much of western North America, including western South Dakota.

Hippodamia quinquesignata quinquesignata (Kirby). Butte, Brookings, Brule, Fall River, Hamlin, Hughes, Pennington, Shannon (SDSU, R.W.K.; Kirk and Balsbaugh 1975, as *Hippodamia quinquesignata* Kirby).

Hippodamia glacialis glacialis (F.). Brookings, Brule, Butte, Dewey, Gregory, Hamlin, Hughes, Hyde, Jackson, Lawrence, Lincoln, Pennington, Perkins, Roberts, Stanley, Sully, Walworth, Yankton (SDSU, NCARL, NDSU, R.W.K.; Kirk and Balsbaugh 1975 as *Hippodamia glacialis* (F.); Gordon 1985:734, virtually statewide).

Hippodamia quindecimmaculata Mulsant. Bon Homme, Brookings, Clay, Corson, Hutchinson, Lincoln, Minnehaha, Union, Yankton (NDSU, SDSU; Kirk and Balsbaugh 1975, as *Hippodamia quindecim-maculata* Mulsant).

Hippodamia convergens Guerin-Meneville. (ISUI, NCARL, NDSU, SDSU; R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:743, statewide).

Hippodamia sinuata crotchii Casey. Brule County, Chamberlain, 14-VI-1967, collector not recorded, undetermined gender (NDSU). **NEW STATE RECORD.** The collection locale of this specimen lies near but slightly beyond the previous eastern distribution boundary for this species (Gordon 1985:751).

Anatis labiculata (Say). Bon Homme, Brookings, Brule, Butte, Custer, Hutchinson, Lawrence, Lincoln, Meade, Mellette, Lincoln, Roberts, Union, Yankton (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975, as *Anatis quindecimpunctata* and *A. quindecimpunctata caseyi* and perhaps *Anatis mali*, in part; Gordon 1985:756, virtually statewide).

Anatis mali (Say). Custer, Fall River, Harding, Lawrence, Pennington (ISUI, NCARL, NDSU, SDSU; Kirk and Balsbaugh 1975). Material examined showed a distribution biased toward the western part of South Dakota, but Gordon (1985:764) shows a statewide distribution.

Myzia pullata (Say). Fall River, Pennington (NDSU, SDSU; Kirk and Balsbaugh 1975, as *Neomysia horni*).

Myzia interrupta (Casey). No specimens of this species were found, but Gordon (1985:768) showed a statewide distribution.

Calvia quatuordecimguttata (L.). Custer, Lawrence, Meade, Pennington, Roberts (NDSU, SDSU; Kirk and Balsbaugh 1975, as *Anisocalvia quatuordecimguttata* and *Anisocalvia duodecimaculata*; Gordon 1985:779, statewide).

Adalia bipunctata (Schneider). Aurora, Bennett, Bon Homme, Brookings, Brown, Brule, Butte, Clark, Clay, Corson, Custer, Day, Deuel, Fall River, Grant, Hughes, Hutchinson, Hyde, Jackson, Lake, Lincoln, McCook, Pennington, Roberts, Stanley, Todd, Tripp, Union, Yankton (ISUI, NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 as *Adalia bipunctata* (statewide) and *Adalia frigida*; Gordon 1985:784, statewide).

Coccinella trifasciata perplexa Mulsant. Bon Homme, Brookings, Custer, Lawrence, Meade, Pennington (SDSU; Kirk and Balsbaugh 1975; Gordon 1985:789, statewide).

Coccinella transversoguttata richardsoni Brown. Brookings, Butte, Campbell, Davison, Day, Deuel, Fall River, Haakon, Hamlin, Harding, Hughes, Jackson, Jones, Lake, Lawrence, Meade, Mellette, Perkins, Pennington, Shannon, Walworth, Yankton (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975, statewide; Gordon 1985:792, statewide).

Coccinella septempunctata L. Dry Lake, Hamlin County, 23-V-1979 and Dry Lake, Hamlin County, South Dakota, 24-V-1979, collector not recorded (NDSU; R.W.K.). **NEW STATE RECORD.** Several specimens collected subsequently from Beadle, Brookings, Clay, Hamlin, Hyde, Lawrence, Minnehaha, Moody, Pennington counties (NCARL, SDSU, R.W.K.; Elliott *et al.* 1996). The specimens from Dry Lake in 1979 may be individuals that successfully overwintered following release of this species at the site in 1978 (Shaefer *et al.* 1987). This record predates the earlier published records of *C. septempunctata* in South Dakota in 1988 (Elliott *et al.* 1996). Given its relatively rapid spread in North America, *Coccinella septempunctata* may now be considered to occur statewide.

Coccinella novemnotata Herbst. Bennett, Bon Homme, Brookings, Butte, Campbell, Charles Mix, Custer, Day, Deuel, Dewey, Gregory, Haakon, Harding, Hughes Hyde, Jackson, Jones, Kingsbury, Lake, Lake, Lawrence, McPherson, Meade, Pennington, Perkins, Sully, Tripp, Union, Walworth (NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:795, statewide).

Coccinella monticola Mulsant. Pennington (Kirk and Balsbaugh 1975; Gordon 1985:813, statewide).

Coccinella hieroglyphica kirbyi Crotch. Meade (SDSU; Kirk and Balsbaugh 1975).

Cycloneda munda (Say). Beadle, Brookings, Brule, Buffalo, Butte, Clay, Davison, Grant, Hughes, Jackson, Jackson, Lake, Lawrence, Lawrence, Lincoln, Lyman, Meade, Minnehaha, Pennington, Roberts, Union, Yankton (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:822, statewide).

Olla v-nigrum (Mulsant). Brookings, Buffalo, Hyde, Union (NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 as *Olla abdominalis* and *Olla abdominalis plagiata*; Gordon 1985:830, statewide).

Harmonia axyridis (Pallas). Brookings, Butte, Hyde, Moody (NCARL, R.W.K.). Generally considered statewide (Koch 2003; Hesler and Kieckhefer 2008).

Mulsantina picta (Randall). Custer, Lawrence, Pennington, Sully (SDSU; Kirk and Balsbaugh 1975; Gordon 1985:847, statewide).

Tribe Halyziini Mulsant

Psyllobora vigintimaculata (Say). Bon Homme, Brookings, Buffalo, Butte, Charles Mix, Clay, Fall River, Grant, Gregory, Hamlin, Harding, Hughes, Jones, Lawrence, Lincoln, Marshall, Meade, Pennington, Roberts, Union, Yankton (NCARL, NDSU, SDSU, R.W.K.; Kirk and Balsbaugh 1975 and Gordon 1985:857, statewide).

Subfamily Epilachninae Ganglbauer

Tribe Epilachnini Costa

Epilachna varivestis Mulsant. Lawrence, Shannon (SDSU; Kirk and Balsbaugh 1975 and Gordon 1985:867).

Discussion

Faunal distributions are dynamic, and faunal lists for a particular geographic entity change (Brodman *et al.* 2002; McCorquodale and Bondrup-Nielsen 2004). Faunal lists may increase from additional collecting, curation of previously collected material, and geographic range expansion of species (Fauske *et al.* 2003; McCorquodale and Bondrup-Nielsen 2004). In the present study, the curation and reevaluation of previously collected material alone added twelve (net eleven) species of coccinellids to the South Dakota list. Similarly, recent reviews of insect collections from other regions near South Dakota have yielded additional species records of coccinellids. A review of museum specimens added 9 new species records of scymnine coccinellids for the province of Manitoba, with some collection records dating to the early 1900s (Wise *et al.* 2001). Recent curation of collected material from North Dakota and Minnesota yielded five new species records for each state (Fauske *et al.* 2003). These outcomes, coupled with our results, lead us to predict that a review of other collections would yield additional species records of coccinellids, and support the argument that ongoing curation and periodic review of collections is important for maintaining accurate regional lists of species (McCorquodale and Bondrup-Nielsen 2004).

In addition to new species records, regional lists may need updating because of systematic revisions that increase or decrease faunal lists due to the “lumping and splitting” of taxa (Fauske *et al.* 2003). Several synonymies stemming from revisions in coccinellid taxonomy (Gordon 1976, 1985) since the publication of Kirk and Balsbaugh (1975) led to deletions and name replacements, and overall these synonymies decreased the number of coccinellid taxa listed for South Dakota. These many changes in taxonomy alone justified updating the state coccinellid species list, and suggest that periodic updates of species lists should follow broad taxonomic revisions such as those in Gordon (1985).

A review of coccinellids in the collections also provided information on recently introduced species and some species of conservation concern. Elliott *et al.* (1996) reported that *C. septempunctata* was first recorded from South Dakota in 1987, but we found four specimens of *C. septempunctata* in the collections from May 1979. The four specimens may indicate successful overwintering following the release of 13,100 *C. septempunctata* at Dry Lake in October 1978, but despite multiple sampling occasions each year since 1979, *C. septempunctata* was not found again in South Dakota until 1987 in Brookings County, about 20 miles southeast of Dry Lake (Shaefer *et al.* 1987; Elliott *et al.* 1996). Thus, it is unclear whether the 1987 collection records of *C. septempunctata* stem from populations

that persisted from the 1978 introduction, became established due to range expansion from the south and east (Shaefer *et al.* 1987), or both.

Coccinella septempunctata has been implicated in the decline of *C. transversoguttata richardsoni*, *C. novemnotata*, and *Adalia bipunctata* (Wheeler and Hoebeke 1995; Elliott *et al.* 1996), and the abundance of these latter three species has declined drastically in South Dakota (Elliott *et al.* 1996; Hesler *et al.* 2005; Hesler and Kieckhefer 2008). Only a few, relatively recent specimens of *C. transversoguttata richardsoni*, *C. novemnotata*, and *A. bipunctata* were found among the collections reviewed. The 1977 specimen of *C. novemnotata* is the latest known record of this species in South Dakota. A small number of *A. bipunctata* and *C. transversoguttata richardsoni* have been collected in eastern South Dakota since 1988 (Elliott *et al.* 1996; Hesler *et al.* 2005), but no voucher specimens of these species were found. The 2006 specimen of *C. transversoguttata richardsoni* suggests that this species may still be present, though rare, in eastern South Dakota, and highlights the conservation value in periodically reviewing collection holdings (McCorquodale and Bondrup-Nielsen 2004).

However, the majority of all coccinellid specimens examined in the current study were collected before 1980, and thus there is a need for additional collection and curation of coccinellids from South Dakota, particularly from the western half of the state. Some species were represented by only one to a few specimens, and additional collecting is needed to improve knowledge of their distribution in South Dakota. More surveys of coccinellids could improve understanding of the status of *C. transversoguttata richardsoni*, *C. novemnotata*, and *A. bipunctata*, and generally support the conservation of lady beetle species in South Dakota (Harmon *et al.* 2007; Hesler *et al.* 2004, 2005; Hesler and Kieckhefer 2008).

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