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The Biology and Ecology of the Tiger Beetles (Coleoptera: Cicindelidae) of Nebraska

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Nebraska has a large and diverse Cicindelidae fauna. This paper lists three genera and 32 species and subspecies as occurring in the State. The large number of species can be attributed to the number of physiographic regions (six) found in the State. Distinct topographic, floristic, and climatic features found in the regions have created a large number of favorable habitats for tiger beetles. This paper presents information on the biology and ecology of the species of tiger beetles found in Nebraska as related to the physiographic regions in the State. Morphological descriptions, line drawings, and a key are presented to aid in species identification. The seasonal and spatial distributions of the tiger beetles are outlined and presented in conjunction with county distribution maps, habitat requirements, and species associations.

‡ ‡ ‡

INTRODUCTION

Tiger beetles are ground-dwelling predaceous insects. Eighty-five species and over 200 subspecies or geographical forms of tiger beetles of the genus *Cicindela* are known from the United States (Boyd et al., 1982). Members of the family Cicindelidae have long been popular with collectors, and considerable information exists on the distribution of this group in the United States (see below) and Canada (Wallis, 1961; Freitag, 1965; Hilchie, 1985). Knowledge of the biology and ecology of this group has recently improved (Willis, 1967; Pearson and Stemberger, 1980; Hori, 1982; Knisely, 1984; Knisely and Pearson, 1984, 1985; Schultz and Hadley, 1987; Pearson, 1988).

Nebraska's large and diverse Cicindelidae population was recognized by Bruner (1901), who recorded 41 species from the State, and by Meserve (1936), whose review of the species in the University of Nebraska State Museum reported 57 varieties of 37 species. Willis (1972) and Boyd et al. (1982) listed 29 species as occurring in Nebraska. The number of known species and subspecies is now 32. Discrepancies between the number of species reported in this and previous papers are primarily due to incorrect identifications, changes in taxonomic status, and nomenclatural changes. While Nebraska has a large tiger beetle fauna compared to many other U.S. States (Table I), virtually no information exists on their abundance, habitat preference, and seasonal distribution (but see Willis, 1967).

Nebraska is a biological crossroads where many species reach distributional limits. The Nebraska cicindelid fauna, flowering plants, trees (Pool, 1919), lepidoptera (S.M. Spomer, pers. comm., Lincoln, NE), and scarab beetles (B.C. Ratcliffe, pers. comm., Lincoln, NE) are characterized by species from several geographic regions (eastern and western North America, Central Plains of the U.S., etc.). The

distribution and regional affiliation of cicindelids in Nebraska are outlined in Table II (from the known United States distribution of tiger beetle species [Boyd et al., 1982]). Three western species, two eastern species, two northeastern species, and one southwestern species can be recognized as being at or near their distributional limits in Nebraska. Eight species whose distributions overlap into the Central Plains occur in Nebraska, three approach or reach northern limits and one its southern limits. Many species with broader United States distributions have geographical forms that have range limits in the State. While these limits are more ambiguous due to the variability of geographical forms, five such forms reach or approach eastern limits and one reaches western limits. Six species found in Nebraska have broad ranges in the United States, and one is a subspecies endemic to the State. Four central plains species occur in the State.

Species diversity in Nebraska is related to the number of distinct physiographic regions (Fig. 1) in the State. Six major physiographic regions are identifiable in the State and are characterized by distinct topographic, geologic, and floristic features: 1) Missouri River bottoms and bluffs; 2) Eastern Plains; 3) Central Plains; 4) Sand Hills; 5) Western Plains; 6) Pine Ridge (Pound and Clements, 1900). These regions are representative of larger geographical/physiographic regions of the United States or are unique to Nebraska (Sand Hills). The cicindelid fauna of a physiographic region in Nebraska is generally representative of the larger U.S. physiographic region. The confluence of several regions in Nebraska over a relatively short east-west gradient has created a wide variety of habitats (Table III) and environmental conditions. These factors have significantly influenced the distribution and abundance of cicindelids in the State. The purpose of this study is, therefore, to investigate the distribution and ecology of the Cicindelidae of Nebraska with reference to the physiographic regions and habitat influences.

Nebraska's location (90° to 104°W; 40° to 43°N) and size (265,000 sq mi, 68,635,000 ha) contribute to the State's physiographic diversity. The State is near the geographical center of the United States and is the interface between physical, floristic, and faunistic features of the east and west. Borders of physiographic regions are not distinct, and most species are not confined to a single region. Species that are extremely habitat specific, or those reaching distributional limits are often most abundant in the Nebraska region that is highly characteristic of the larger U.S. region where the species is most common.

CLIMATE

The climate of Nebraska is well suited for Cicindelidae. It is characterized by hot summers and cold winters; temperatures sufficiently high for tiger beetle activity can occur from March to November. Rainfall is light and humidity relatively low. Daily and yearly variation in temperature and precipitation can be great. Rainfall and temperature patterns change in an east- to-west gradient across the State. Greater climatic variation exists across Nebraska than from Nebraska eastward to the Atlantic coast (Elder, 1969). Precipitation is greatest in the eastern one-third of the State (27 in [68.6 cm] per year) and lightest in the western one-third (18 in [45.7 cm] per year). Most rainfall occurs in violent thunderstorms in May, June, and July. August is generally the hottest month. Nebraska has an average of 65% annual sunshine and 80% in July (Stevens, 1976).

CHECKLIST OF THE CICINDELIDAE OF NEBRASKA

Classification from Boyd et al. (1982)

SUBFAMILY CICINDELINAE

Tribe Amblychilini

Genus *Amblychila* Say: *A. cylindriformis* Say

Tribe Megacephalini

Genus *Megacephala* Latreille: *M. virginica* (L.)

Tribe Cicindelini

Genus *Cicindela* (L.)

Subgenus *Cicindela* L.

Group *Cicindela* (*campestris* group)

Subgroup 1 (*longilabris* subgroup)

- C. longilabris* Say
- C. nebraskana* Casey

Subgroup 2 (*maritima* subgroup)

- C. repanda* Dejean
- C. duodecimguttata* Dejean
- C. hirticollis* Say
- C. limbata* Say

Subgroup 3 (*formosa* subgroup)

- C. formosa* Say
- C. purpurea* Olivier
- C. splendida* Hentz
- C. denverensis* Casey
- C. limbalis* Klug
- C. sexguttata* Fabricius

Subgroup 4 (*pulchra* subgroup)

- C. pulchra* Say
- C. fulgida* Say

Group *Pachydela* (*scutellaris* group)

- C. scutellaris* Say

Group *Tribonia* (*tranquebarica* group)

- C. tranquebarica* Herbst
- C. lengi* Hom

Subgenus *Cicindelidia* Rivalier

- C. punctulata* Olivier

Subgenus *Habroscelimorpha* Dokhtourow

- C. circumpicta* LaFerte

Subgenus *Eunota* Rivalier

- C. togata* LaFerte

Subgenus *Cylindera* Westwood

- C. cursitans* LeConte
- C. celeripes* LeConte
- C. terricola* Say

Subgenus *Ellipsoptera* Dokhtourow

- C. nevadica* LeConte

- C. cuprascens* LeConte
- C. macra* LeConte
- C. lepida* Dejean

KEY TO THE GENERA OF CICINDELIDAE OF NEBRASKA

After Bertholf (1983)

- 1a. Third joint of the maxillary palpi shorter than the fourth *Cicindela*
- 1b. Third joint of the maxillary palpi longer than the fourth 2
- 2a. 25-35 mm; eyes small *Amblychila cylindriformis*
- 2b. 15-25 mm; eyes large *Megacephala virginica*

KEY TO CICINDELA OF NEBRASKA

After Willis (1968), Graves and Pearson (1973), and Bertholf (1983).

- 1a. Clypeus densely to sparsely clothed with decumbent setae 2
- 1b. Clypeus glabrous or with a few erect setae 6
- 2a. Sides of pronotum very convex; markings consist of a complete broad white marginal band but without a discal middle band *C. togata* Casey
- 2b. Sides of pronotum straight or slightly curved; markings "normal" 3
- 3a. Legs pale, unpigmented; abdominal sternites clothed mid-ventrally as well as laterally with white decumbent setae *C. lepida* Dejean
- 3b. Legs pigmented; abdominal sternites with mid-ventral glabrous strip 4
- 4a. Elytra with basal dot 5
- 4b. Elytra without basal dot *C. nevadica* Leng
- 5a. Elytra with large, deep punctures, surface shining; elytral tip of female recurved, sutural spine subapical, blunt *C. cuprascens* LeConte
- 5b. Elytra with smaller, shallow punctures, surface usually dull opaque; elytral tip of female produced, sutural spine apical, acute, produced *C. macra* LeConte
- 6a. Frons with erect setae (besides supraorbital setae) 16
- 6b. Frons glabrous (or with a few decumbent setae); besides supra-orbital setae there may be a cluster of ten or more in front of the eyes 8
- 8a. Small "ant-like beetles," less than 9 mm in length; prothorax cylindrical with nearly straight sides 9
- 8b. Without the above combination of characters 10
- 9a. Elytra notably expanded in apical one-half; markings usually reduced, without complete marginal line or no marginal line *C. celeripes* LeConte
- 9b. Elytra not notably expanded apically; usually with marginal line *C. cursitans* LeConte
- 10a. Labrum short 11
- 10b. Labrum long 13
- 11a. Elytra microsculptate 14
- 11b. Elytra not microsculptate 12
- 12a. First antennal segment with numerous setae *C. scutellaris* Say

Pine Ridge

Topology: Steep escarpment with numerous canyons, ridges, and bluffs. Wildcat Range in southern panhandle is similar.
 Vegetation: Ponderosa pine, shrubs, and herbs typical of the western mountains. Dakota Prairie north of the escarpment, shale soils covered primarily by wheatgrass.
 Tiger beetle species: 7.
 Note: Region is similar to Rocky Mountain region and is a biologic and topologic remnant.

Sandhills

Topology: Rolling hills formed by wind-blown sand.
 Vegetation: Only place in world where the association of bluestem grasses, sandreed grasses, needlegrass, and yucca occur on sand.
 Tiger beetle species: 10.

Missouri River Bluffs and Bottoms

Topology: Steep bluffs with exposed sandstone and limestone. River bottom soils are silt, clay, sand, and gravel.
 Vegetation: Typical of eastern deciduous forests. River bottom covered by cottonwoods, willows, and cordgrass.
 Tiger beetle species: 13.

Western Plains

Topology: Sandhill - like areas in Dundy, Perkins, Chase, and Lincoln counties. Platte River valley is flat with steep escarpments. Rest of region underlain by sandstone supporting a shortgrass prairie of blue grama grass, sandsage and sandreed grass. Saline flats are common in the western most counties.
 Tiger beetle species: 15.

Central Plains

Topology: Eastern and northern sections are flatlands covered with wind-deposited loess. The rest of the region, primarily the western section, consist of dissected plains and small canyons.
 Vegetation: Mixed grasses, primarily bluestem, grama and buffalo grasses. River valleys are vegetated by floodplain prairie and forest.
 Tiger beetle species: 11.
 Note: In the Niobrara River area, eastern oak forests and western ponderosa forests meet, the only place in the U.S.

Eastern Plains

Topology: Rolling hills in the eastern section are primarily glacial till, eroded and mantled by loess. Flat plains in the western section are mainly wind-deposited loess.
 Vegetation: Prior to cultivation, tall grasses such as bluestem and switchgrass and a variety of flowering plants. Trees and shrubs are now more abundant since the elimination of range fires.
 Tiger beetle species: 17.
 Note: Slat flats in Lancaster Co. are unique to the region. These were large barren area interspersed with sparse vegetation, but have largely been eliminated.

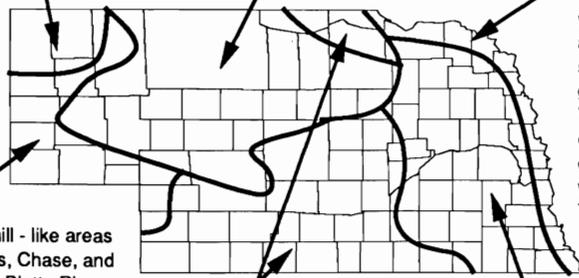


FIGURE 1. Physiographic regions of Nebraska, with pertinent topographic and floristic information and the number of species of Cicindelidae occurring in each region.

- 12b. First antennal segment with one seta; small beetle, may or may not be maculated, black, green, or brown *C. terricola* Say
- 13a. Elytra shallowly punctate or sculptured into waves, shiny between punctures or on tops of wave *C. nebraskana* Casey
 13b. Elytra granulate, dull or only slightly shiny near bases *C. longilabris* Say
- 14a. First antennal segment with one seta 15
 14b. First antennal segment with three or four setae at the apex *C. sexguttata* Fabricius
- 15a. Labrum tridentate *C. cicumpicta* Fitch
 15b. Labrum unidentate *C. punctulata* Olivier
- 16a. Genae with setae 7
 16b. Genae glabrous 26
- 17a. Labrum unidentate or non-dentate 18
 17b. Labrum with three or more teeth 20
- 18a. Proepisternal setae decumbent; elytra almost completely white *C. limbata* Say
 18b. Proepisternal setae erect 19
- 19a. Elytral markings usually complete; humeral lunule connected to the marginal line; thorax broadly cylindrical *C. repanda* Dejean
 19b. Elytral markings usually broken into disconnected spots; humeral lunule broken and separated from the marginal line; thorax trapezoidal (marginal line usually absent) *C. duodecimguttata* Dejean
- 20a. Elytral markings broadly separated, never connected by a complete marginal band; or markings very small or absent 22
 20b. Elytral markings connected by complete marginal line 21
- 21a. Labrum long (length/width ratio <1.65); body usually <15mm long *C. lengi* Horn
 21b. Labrum short (width/length ratio >1.65); body usually >15 mm long *C. formosa* Say
- 22a. Humeral lunule long and thin, reaching about 1/3 of the length of elytra; elytra brown *C. tranquebarica* Herbst
 22b. Humeral lunule broad and projecting only slightly mesad, composed of one or two dots, or missing; middle band an oblique bent line, transverse dash, or complete with a noticeable bend at the knee; elytra not brown; elytral markings not broad 23
- 23a. Pronotum and head cupreous green or black; elytra green if pronotum cupreous green and black if pronotum black *C. purpurea* LeConte
 23b. Elytra cupreous red or metallic green 24
- 24a. Elytra and pronotum metallic green; found in the western half of the State *C. denverensis* Casey
 24b. Elytra cupreous red 25
- 25a. Pronotum metallic green or blue; Elytra cupreous red *C. splendida* Eckhoff
 25b. Pronotum and head cupreous red *C. limbalis* Leng

- 26a. First antennal segment glabrous or with one or two setae (besides sensory setae) *C. hirticollis* Say
 26b. First antennal segment with at least several erect setae (besides sensory setae) 27
- 27a. Large size (15 – 17 mm); elytral markings reduced, middle band absent or represented by a triangle *C. pulchra* Say
 27b. Medium size (11 – 12 mm); elytral markings complete *C. fulgida* Say

SYSTEMATIC ACCOUNT

Species are discussed in phylogenetic order, as in the preceding checklist. Each genus is presented separately and is preceded by a brief discussion of its biology. Life history patterns for the three genera are discussed under *Cicindela*. The information presented in this section is meant to aid in the understanding the geographical affiliation of species occurring in Nebraska. The general range of species is taken from information in Boyd et al. (1982). The Nebraska distributional listing is by physiographic region. County records, which follow the general and physiographic listings, are arranged in the following sequence: *county, nearest municipality and/or other specific locality*. More specific information is given where warranted.

The brief morphological descriptions are provided to aid in identification of species and are not intended to describe the species fully. Interested individuals should refer to references listed for more complete descriptions. Habitat information is presented to elucidate the biology of the species and associations of tiger beetle groups (species discussions and Table III). The collecting data are taken from major collections and arranged by months. Records are representative of the seasonal abundance of most species, but may be skewed towards summer months due to more frequent collecting during this time of the year (species discussions and Table IV). Seasonal abundance (Table IV) is listed by month followed by the number of individuals collected during that month.

Records and collecting data were obtained from the following papers, collections and collectors: University of Nebraska State Museum (UNSM), Lincoln; Willis (1967); Chadron State College, Chadron, NE; Mark R. Carter collection, Lincoln, NE; Walter Johnson collection, Minneapolis, MN; Steve Spomer collection, Lincoln, NE; Dave Brzoska collection, Lawrence, KS; Ron Huber collection, Kansas City, KS; American Museum of Natural History; National Museum of Natural History; North Dakota State Museum; Dean Eckhoff (collecting information supplied by Ron Huber); Kansas State University; University of Kansas; Nebraska State Fair 4-H insect collections, 1985; Art Hagen collection, Scottsbluff, NE; Mike Rethwisch collection, Lincoln, NE. Gary Dunn, East Lansing, MI, provided these six collections: 1. Michigan State University; 2. Robert R. Murray collection, College Station, TX; 3. Florida Division of Plant Industry Gainesville, FL; 4. San Diego Natural History Museum, San Diego, CA; 5. University of Michigan Museum of Zoology, Ann Arbor, MI; 6. Donald A. Wilson collection, Kensington, NH.

Tribe AMBLYCHILINI: *Amblychila*

These are the largest tiger beetles in North America. They are darkly-colored, immaculate, and nocturnal; they do not fly and are not attracted to lights. Rarely collected, they are probably more abundant than indicated by present records. Five species are widely distributed in the western third of the United States and Mexico; one, *A. cylindriciformis*, occurs in west-central Nebraska.

TABLE I. Number of species of Cicindelidae in selected states

State	No. species	Reference
Arizona	27	Bertholf (1983)
Arkansas, Louisiana, Mississippi	33	Graves & Pearson (1973)
Iowa	21	Eckoff (1939)
Kansas	29	Willis (1970)
Michigan	14	Graves (1963)
Nebraska	32	<i>this paper</i>
New Hampshire	16	Dunn (1981)
New Jersey	20	Boyd (1978)
New Mexico	31	Acciavatti et al. (1979)
Ohio	20	Brzoska (1976)
Oklahoma	28	Drew & Van Cleave (1961)
Texas	41	Gaumer & Murray (1971)
Washington	17	Leffler & Pearson (1976)

TABLE II. Species of Cicindelidae approaching or reaching distributional limits in Nebraska. Primary regional affiliation in the United States is by region in which the species is most common.

US region	Distributional limit in Nebraska
WEST	Eastern limits <i>C. denverensis</i> , <i>C. formosa formosa</i> , <i>C. nebraskana</i> , <i>C. nevadica</i> , <i>C. scutellaris scutellaris</i> , <i>C. terricola cinctipennis</i> , <i>C. terricola terricola</i>
NORTHWEST	Southeastern limits <i>C. limbalis</i> , <i>C. longilabris</i>
CENTRAL PLAINS	Northern limits <i>C. celeripes</i> , <i>C. circumpicta</i> , <i>C. togata</i> Southern limits <i>C. limbata</i>
SOUTHWEST	Northeastern limits <i>C. pulchra</i>
EAST	Western limits <i>C. scutellaris lecontei</i> , <i>C. sexguttata</i> , <i>M. virginica</i>

Amblychila cylindriformis Say 1823:139 (Fig. 2, 34)

Head and pronotum black, elytra reddish to brown. Immaculate.

Range: Central Great Plains. Nebraska: Western Plains. KEITH: Cedar Point Biological Station, 26-VI-1984, B.C. Ratcliffe-(3) (UNSM); Cedar Point Biological Station, VII-14-1986, D. Brzoska-(2). SCOTTS BLUFF: Mitchell, 19-VII-1912, L.M. Gates (UNSM).

Status: The largest cicindelid in the United States. Widely distributed across the central U.S.; reaches distributional limits in northern Nebraska and southern South Dakota. Not recorded extensively in Nebraska; first record based on fragments collected by Bruner (1901) from the Republican River Valley, exact location unknown. Probably more common in the Central and Western Plains of Nebraska, in dissected ditches and gullies so characteristic of this area. The species' nocturnal habitats have probably caused it to be overlooked by many general collectors.

Tribe MEGACEPHALINI: *Megacephala*

Species of this genus are nocturnal and are frequently attracted to lights; they seek shelter under rocks, boards, etc., during the day. They are widely distributed in southern North America. The single Nebraska species, *M. virginica*, is near its northern range limit in Nebraska, although individuals have been collected farther north.

Megacephala virginica L. 1766:657 (Fig. 3, 34)

= *Tetracha virginata* Linnaeus 1788:1922; *T. melana* Cartwright 1935:70.

Dorsal surfaces: head, thorax, and elytra dark blue-green and reflective. Ventral surfaces: mostly dark brown and legs pale brown. Immaculate.

Range: southern United States; Nebraska: Missouri River Valley and Bluffs, Eastern Plains. DUNDY: Haigler; GAGE: Beatrice; JOHNSON: no data; LANCASTER: Burnham, Lincoln.

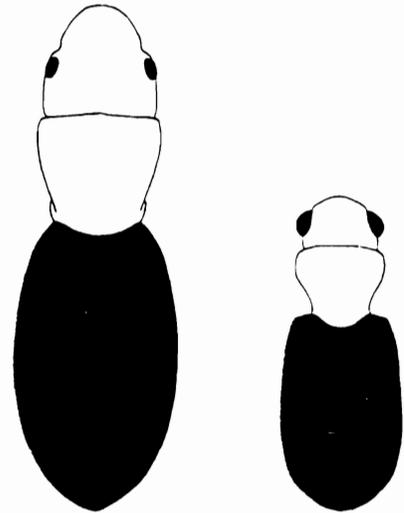
Status: Most commonly collected in southeastern Nebraska, but probably more widespread than indicated by collecting records.

Seasonal distribution: April (1), June (2), July (7), August (18), September (29), October (3).

Tribe CICINDELINI: *Cicindela*

This genus includes the majority of the U.S. species. The many species are quite uniformly oblong but differ in size and color. Most

possess hind wings and can fly, although two Nebraska species apparently do not fly. Legs are usually long, slender, and adapted for running. The main characters used to identify species are the variation in the markings on the elytra and elytral color; the presence or absence of extremely fine serrations on the sides of the elytra near the apex; and the presence or absence of setae on the front and top of the head. The type and degree of elytral markings are used a great deal in the identification of various species. Although only the dark areas are pigmented, the term *maculation* usually refers to the pale portions of the elytra and these consist of various curved bands and spots. A diagram of these markings and the terms applied to them is shown in Figure 4. When all these markings are present and entire, they are considered to be complete. When lacking in parts or broken up into dots, they are incomplete.



FIGURES 2, 3. 2. *Amblychila cylindriformis* (average length: 28 mm). 3. *Megacephala virginica* (average length: 16 mm).

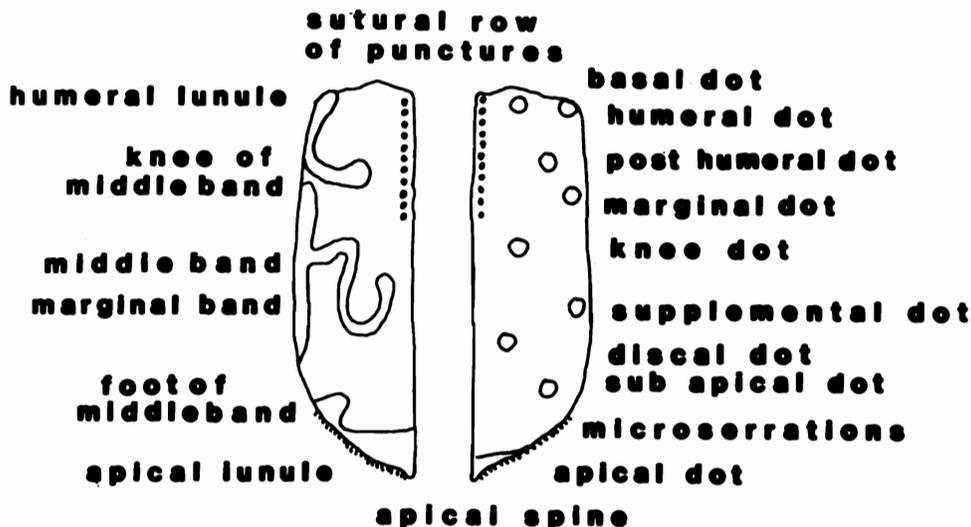


FIGURE 4. Elytra of generalized species of *Cicindela*, showing terms applied to lunules, bands, and dots.

TABLE III. Habitats and associations of tiger beetles in Nebraska. Physiographic regions: CP - Central Plains; EP - Eastern Plains; MRV - Missouri River Valley and bluffs; PR - Pine Ridge; SH - Sandhills; WP - Western Plains.

Habitat	Regions and associations
Sand blowouts and bare flats	EP, MRV: <i>Cicindela formosa</i> , <i>C. scutellaris lecontei</i> , <i>C. tranquebarica</i> . SH: <i>C. formosa</i> , <i>C. lengi</i> , <i>C. lepida</i> , <i>C. limbata</i> , <i>C. sc. scutellaris</i>
Eroded banks	CP, EP, MRV: <i>C. limbalis</i> , <i>C. splendida</i> PR, WP: <i>C. denverensis</i> , <i>C. lengi</i> , <i>C. formosa</i> , <i>C. purpurea</i> , <i>C. sc. scutellaris</i> , <i>C. splendida</i> .
Stream- and riverbanks	All regions (clay substrate): <i>C. duodecimguttata</i> , <i>C. repanda</i> All regions (sand substrate): <i>C. cuprascens</i> , <i>C. hirticollis</i> , <i>C. macra</i> , <i>C. repanda</i>
Saline flats and ditches	EP: <i>C. circumpecta</i> , <i>C. fulgida</i> , <i>C. nevadica lincolniana</i> , <i>C. togata</i> WP: <i>C. fulgida</i> , <i>C. nevadica knausi</i> WP, PR: <i>C. cursitans</i> , <i>C. terricola cinctipennis</i> , <i>C. t. terricola</i>
Dry ditches	PR, WP: <i>Amblychila cylindriformis</i>
Dry flats	WP: <i>C. pulchra</i>
Open areas	PR: <i>C. nebraskana</i>
Bare spots	EP, MRV: <i>Megacephala virginica</i>
Forest paths	MRV: <i>C. celeripes</i> , <i>C. sexguttata</i>
Ubiquitous	All: <i>C. punctulata</i>
Unknown	EP: <i>C. longilabris</i>

TABLE IV. Seasonal pattern and monthly abundance of Cicindelidae in Nebraska.

Species	Seasonal pattern*	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
<i>Amblychila cylindriformis</i>	S					3	3			
<i>Cicindela celeripes</i>	S					64	116	1		
<i>C. circumpecta</i>	S					241	94	8	6	
<i>C. cuprascens</i>	S					6	20	11		
<i>C. cursitans</i>	S					50	84	19		
<i>C. denverensis</i>	SF	5	82	250	155	5				2
<i>C. duodecimguttata</i>	SF	1	10	3	2		1	1	7	
<i>C. formosa</i>	S			2	57	100	68	127	63	
<i>C. fulgida</i>	SF			3	60	59	72	55	11	3
<i>C. hirticollis</i>	SF			11	8	152	52	6	4	5
<i>C. lengi</i>	SF			25	54	37	23	38	3	
<i>C. lepida</i>	S			1		4	70	2		
<i>C. limbalis</i>			44	18	11	1	2		3	9
<i>C. limbata</i>	SF				145	181	108	29	215	20
<i>C. longilabris</i>							2			
<i>C. macra</i>	S					34	132			
<i>C. nebraskana</i>	S					2	3		1	
<i>C. nevadica knausi</i>	S					42	58	73		
<i>C. nevadica lincolniana</i>	S				42	78	73			
<i>C. pulchra</i>	S				1		1	1		
<i>C. punctulata</i>	S					36	176	100	21	8
<i>C. purpurea</i>	SF	2	28	71	34	7		10	25	10
<i>C. repanda</i>	SF			39	60	100	43	19	133	9
<i>C. scutellaris lecontei</i>	SF			88	40	3	1		18	4
<i>C. scutellaris scutellaris</i>	SF			57	38	10	15	15	52	
<i>C. sexguttata</i>	S				2	66	23	11	1	
<i>C. splendida</i>	SF	1	78	91	38	2	1		13	9
<i>C. terricola cinctipennis</i>	S				1	62	3	34		
<i>C. terricola terricola</i>	S					48	72	39		
<i>C. togata</i>	S					166	77	36	9	
<i>C. tranquebarica</i>	SF		16	64	35	9	3	13	22	
<i>Megacephala virginica</i>	S			1		2	7	18	29	3

*S: summer. SF, spring and fall.

Adults are diurnal and may be found in a variety of habitats (Table III). Generally these habitats are bright, sunny areas and in Nebraska include saline flats, edges of ponds and lakes, banks of streams and rivers, clay and chalky banks, sunny paths and ditches in forests, sand dunes and blowouts, and open roadsides. Adults of most species are very active insects with the ability to run rapidly along the ground and, when disturbed, to quickly disperse on strong flights. They are difficult to capture and usually must be taken with a net. During the day tiger beetles hunt for prey. At night and on rainy or cloudy days they hide in holes in the soil, under bark, chips, stones, dried mud, rubbish, or other similar cover. Eighty-five species and over 200 subspecies or geographical races of *Cicindela* are known from the United States (Boyd et al., 1982); thirty species and subspecies have been reported from Nebraska (adapted from Boyd, 1978).

Life history patterns

Life history strategies determine the temporal patterns and abundance of larval and adult tiger beetles (all species listed in this paper). The most common life cycle of tiger beetles lasts two years (Willis, 1967), but may vary from one to four years. Adult tiger beetles are active for a short period of this time, usually only for a few months. Three seasonal patterns (spring, spring and fall, and summer) based on when adults are active have been recognized (Shelford, 1908). Species with spring or summer seasonal pattern are univoltine and adults are present during spring or summer months. Species with a spring and fall seasonal pattern emerge as sexually immature adults in the fall, overwinter, reproduce during the following spring, and then die. The seasonal patterns and monthly abundance (from collection records) of Nebraska species are listed in Table IV. General collecting records are more representative of when collectors were in an area to collect (summer months in particular) and are not representative of systematic seasonal collecting. Therefore, monthly abundance records may not accurately reflect actual seasonal patterns. Secondly, environmental conditions (primarily temperature) in Nebraska may shift or alter the seasonal pattern of some species. However, except in a few cases, these records are a good indication of a species' seasonal abundance. Most spring-and-fall species have fewer than the expected number of specimens in the fall, and three species (*C. fulgida*, *C. limbata*, and *C. lengi*) are probably overrepresented in summer months. *Cicindela sexguttata* is generally considered a spring species, but is only found in summer months in Nebraska. *Cicindela hirticollis* is unusual in that the apparent seasonal distribution is during the summer. However, this is an artifact of the spring adults re-emerging late and the fall adults emerging early.

Cicindela longilabris Say 1824:268 (Fig. 5, 42)

= *C. albilabris* Kirby 1837:12; *C. spissitarsis* Casey 1913:18.

Dorsal surfaces: dull black to dark brown. Ventral surfaces: abdomen dark purple or metallic blue, thorax shiny green. Maculation: only two specimens have been collected in Nebraska; one is immaculate except for a faint, thin oblique dash at the middle band; the other has maculation of a humeral and post-humeral dot, an oblique dash at the middle band, and a sub-apical dot.

Range: northern States and Canada; Maine to Oregon; southwest U.S. Nebraska: Eastern Plains. LANCASTER: Bennet, 28- VII-1927, C.H. Bratt; Lincoln, 9- VII, R.H. Wolcott.

Status: The two specimens in UNSM are from Lancaster County, collected by two collectors on different dates in July. It is likely that the records are from different years; Bratt's record is from 1927, and Wolcott did not deposit any beetles in the UNSM collection after 1912. The validity of these records, however, remains questionable.

Cicindela nebraskana Casey 1909:268 (Fig. 6, 42)

= *C. canadensis* Casey 1913:17; *C. calgaryana* Casey 1914:18; *C. uteana* Casey 1924:12.

All black, immaculate.

Range: northwestern U.S. and Canada. Nebraska: Pine Ridge. SIOUX: VI, War Bonnet Canyon, M. Cary; War Bonnet Canyon, 28-VI-1901, J.C. Crawford; War Bonnet Canyon, 19-VI-1911, R.H. Wolcott; War Bonnet Canyon, 30-VIII-1911, R.H. Wolcott; Fort Robinson, 13-V-1973, Art Hagen; Chadron, NE, 22-IV-1987, Randy Lawson.

Status: Distributed across the northwestern United States. The Nebraska records represent a southeastern record. The first four individuals collected in Nebraska were taken in Sioux County between 1901 and 1911 from an isolated canyon in the Pine Ridge, War Bonnet Canyon; two more were collected in 1973 near Ft. Robinson State Park in Sioux County. The habitat is not well known, but is probably dirt roads in the grasslands of the Pine Ridge. Status in Nebraska is not clear and further investigation is required.

Cicindela repanda Dejean 1825:74 (Fig. 7, 36)

= *C. hirticollis* Gould 1834:49; *C. baltimorensis* Herbst. 1806:181; *C. unijuncta* Casey 1897:299; *C. hoosieri* Mares 1921:310; *C. duncani* Knaus 1924:126; *C. maehleri* Robinson 1948:27.

Dorsal surfaces: bronze brown. Ventral surfaces: metallic green or sometimes blue. Proepisternum bronze brown with reddish reflections. Maculation: complete and typical of a fully maculated species.

Range: Widely distributed in all of the U.S. and Canada. Nebraska: all. ADAMS, ANTELOPE, BOX BUTTE, CASS, CHASE, CHERRY, CUMING, CUSTER, DAWES, DAWSON, DIXON, DODGE, DOUGLAS, DUNDY, FRANKLIN, GOSPER, HAMILTON, HARLAN, HOLT, HOWARD, KEITH, KNOX, LANCASTER, LINCOLN, MADISON, McPHERSON, NANCE, NUCKOLLS, OTOE, PIERCE, PLATTE, POLK, RICHARDSON, SALINE, SARPY, SAUNDERS, SHERIDAN, SIOUX, SCOTTS BLUFF, STANTON, THAYER, THOMAS, WAYNE, WEBSTER, YORK.

Status: One of the most common species in the United States and Nebraska, found in virtually any fluvial habitat in the State. Adults active in all warm months and may be one of the first species to emerge in the spring. Often found with *C. duodecimguttata* in clay-silt stream beds or *C. hirticollis* in sand-substrate streams.

Seasonal distribution: April (39), May (60), June (100), July (43), August (19), September (133), October (9).

Cicindela duodecimguttata Dejean 1825:73 (Fig. 8, 36)

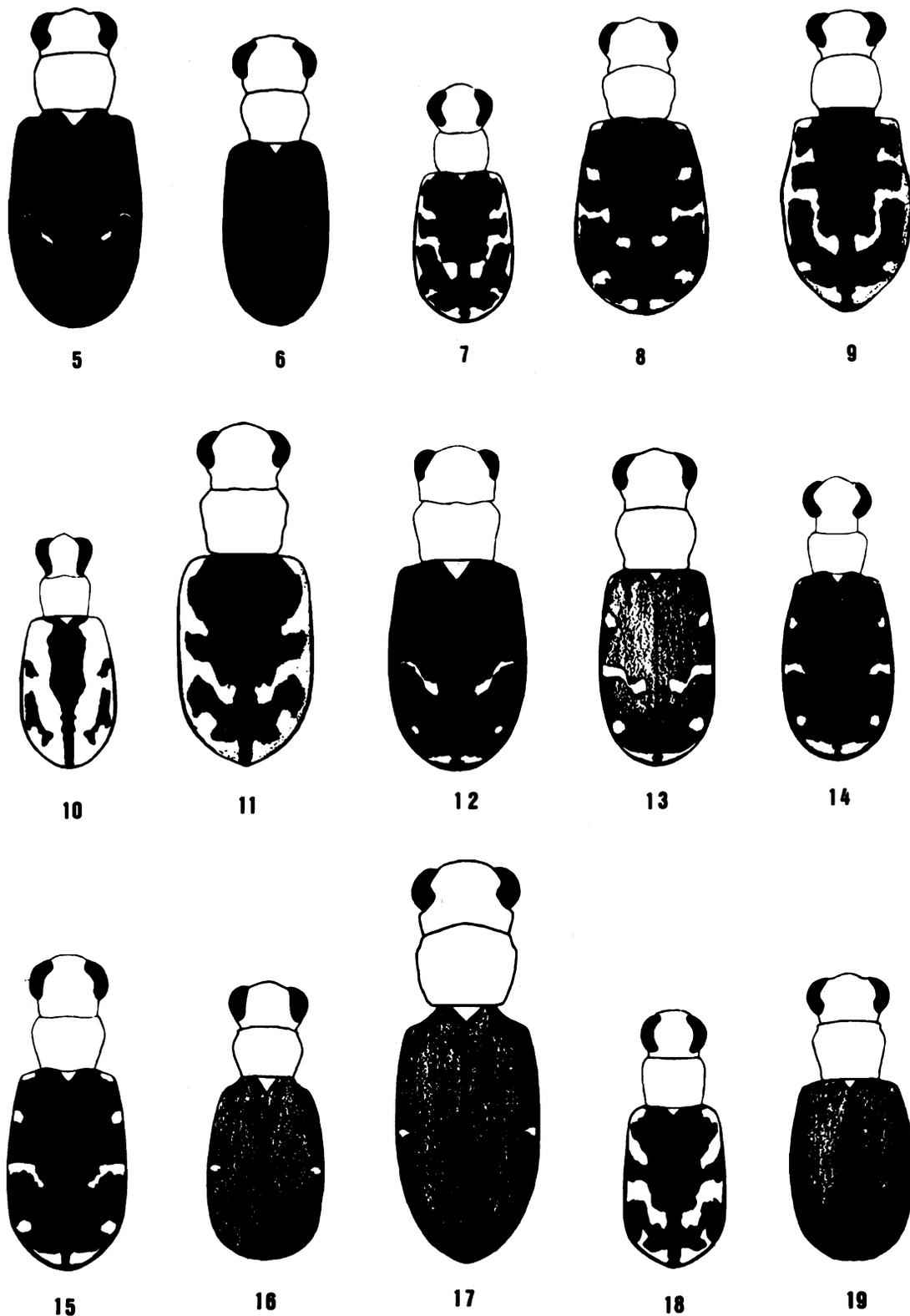
= *C. proteus* Kirby 1837:9; *C. bucolina* Casey 1913:28; *C. hudsonica* Casey 1916:29; *C. edmontonensis* Carr 1920:218.

Dorsal surfaces: dark brown with coppery reflection. Ventral surfaces: metallic blue with greenish reflection, thorax and prothoracic episternum and epimeron brown with cupreous reflection. Maculation: broken and reduced; middle band reduced and often broken at knee; humeral band reduced to a humeral dot and post-humeral dot, apical lunule divided into an apical and sub-apical dot.

Range: Widely distributed east of the Rocky Mountains. Nebraska: Missouri River and Bluffs, Eastern Plains, Central Plains, Western Plains. KNOX: no data; LANCASTER: Waverly, Lincoln, Bennet; NEMAHA: Indian Cave State Park; SCOTTS BLUFF: Scottsbluff; SIOUX: Ft. Robinson; WAYNE: Wayne.

Status: Widely distributed in the U.S. and probably in all parts of Nebraska, preferred habitats are in clay-silt stream beds that are generally steep sided and muddy. In the western part of the State it inhabits sandy-loam stream beds. The few records are most likely a result of its often muddy, inaccessible habitat and drab coloration. It is similar to *C. repanda* and often occurs with it.

Seasonal distribution: March (1), April (10), May (3), June (2), August (1), September (1), October (7).



FIGURES 5—19. *Cicindela* species, with average length (mm) given in parenthesis. 5. *C. longilabris* (14); 6. *C. nebraskana* (12); 7. *C. repanda* (10); 8. *C. duodecimguttata* (11); 9. *C. hirticollis* (12); 10. *C. limbata* (9); 11. *C. formosa* (15); 12. *C. purpurea* (13); 13. *C. splendida* (12); 14. *C. denverensis* (12); 15. *C. limbalis* (12); 16. *C. sexguttata* (10); 17. *C. pulchra* (17); 18. *C. fulgida* (11); 19. *C. scutellaris lecontei* (10).

***Cicindela hirticollis* Say 1817:20 (Fig. 9, 36)**

= *C. alborhota* Dejean 1826:425; *C. unita* Kollar 1836:330; *C. nigrita* Davis 1903:93; *C. rhodensis* Calder 1916:93; *C. shermani* Casey 1916:30.

Dorsal surfaces: dull bronze brown. Ventral surfaces: head and thorax brown to reddish brown. Maculation: complete, with a g-shaped humeral lunule; humeral lunule, apical lunule, and marginal band may be connected.

Range: Widely distributed. Nebraska: all. BUFFALO, BOX BUTTE, CASS, CHERRY, CUMING, DIXON, DUNDY, HALL, HAMILTON, HITCHCOCK, HOLT, HOWARD, KEYA PAHA, KEITH, KNOX, LANCASTER, NANCE, OTOE, PLATTE, RICHARDSON, SARPY, SAUNDERS, THOMAS.

Status: Occurs on sandy creek- and river beds, where it prefers moist areas. Active in the early summer and may be abundant in localized populations. Despite extensive sandy river systems in the State, not common. Commonly occurs with *C. repanda*, but is larger, a stronger flier, and prefers wetter areas along the rivers.

Seasonal distribution: April (11), May (8), June (152), July (52), August (6), September (4), October (5).

***Cicindela limbata* Say 1823:141 (Fig. 10, 37)**

= *C. limbigera* Gemminger and Harold 1868:20.

Dorsal surfaces: variable; elytra may be green, blue, or bronze, head and thorax often the same color as the elytra. Some individuals with green or blue elytra have a bronze thorax and head. Ventral surfaces: metallic blue to purple; some individuals may have a green tint. Maculation: always expanded and covering almost the entire elytra; humeral lunule, middle band, and apical lunule are connected; marginal band connected to the apical and humeral lunules.

Range: WY, SD, NE, CO, UT, ND, Canada. Nebraska: Sand Hills. ARTHUR: Logan; BLAINE: Brewster; BOX BUTTE: Alliance; CHASE: Imperial; CHERRY: Brownlee, Clear Lake, Long Pine, Dewey Lake, Valentine; CUSTER: Anselmo; DUNDY: Benkelman, Haigler; GARDEN: Lisco; GARFIELD: Burwell; GRANT: Hyannis; GREELEY: Greeley; HOLT: Ewing, Chambers; HOOKER: Hooker; HOWARD: St. Paul, Dannebrog; LINCOLN: Highway 97; LOGAN: Stapleton; MORRILL: Angora, Northport, Redington, Bayard; SCOTTS BLUFF: Scottsbluff; SHERIDAN: Lakeside; SIOUX: Henry; STANTON: Stanton; THOMAS: Halsey, Seneca, Theford.

Status: Widely distributed in the Sand Hills and in a few sandy areas bordering them. Suitable habitats are created by wind erosion of sand in the Sand Hills and in sand dunes deposited by rivers. Restricted to portions of sand blowouts of fine sand and bare of vegetation, but can be abundant in these habitats. Sensitive to disturbance and not likely to occur in large numbers where livestock are or have been present. Active in the spring and fall, but may be found in the summer. It does not resemble any other tiger beetle, and is commonly found with *C. lengi*, *C. formosa*, and *C. s. scutellaris*.

Seasonal distribution: May (145), June (181), July (108), August (29), September (215), October (20).

***Cicindela formosa* Say 1817:19 (Fig. 11, 38)**

= *C. luxuriosa* Casey 1913:24; *C. fletcheri* Criddle 1925:127.

Dorsal surfaces: elytra, pronotum, and head same color; may be bright red, reddish purple, or dark reddish purple. Ventral surfaces: range from bright to dark purple; may be all green on head and thorax or have a greenish tint on entire length. Maculation: complete and slightly expanded, bold, with humeral, apical, and marginal bands connected; bend of middle band oblique and extending almost to elytral suture; foot of middle band may be present, but reduced.

Range: Central U.S. west to Rocky Mountains; Texas to Alberta. Nebraska: Eastern Plains, Sand Hills, Pine Ridge, Western Plains. ANTELOPE, ARTHUR, BLAINE, BOX BUTTE, BOYD, BROWN, CASS, CHASE, CHERRY, CUSTER, DAWES, DOUGLAS, DUNDY, GRANT, HAMILTON, HOLT, HOOKER, LANCASTER, LINCOLN, LOGAN, MADISON, NUCKOLLS, SAUNDERS, SCOTTS BLUFF, SHERIDAN, SIOUX, STANTON, THOMAS, WEBSTER.

Status: Found throughout the State, but most abundant in the Sand Hills, Pine Ridge, and Western Plains. Habitats have moderate amounts of vegetation, are dry and not adjacent to water. Found on eroded banks, with *C. lengi* and *C. s. scutellaris* in the

western sections of Nebraska. In eastern Nebraska, suitable habitats are dry sand, often deposited near rivers, where it can be common and interspersed with *C. s. lecontei* and *C. tranquebarica*.

Seasonal distribution: April (2), May (57), June (100), July (68), August (127), September (63).

Cicindela purpurea, *Cicindela splendida*, *C. denverensis*, and *C. limbalis* constitute a group of closely related and morphologically similar species. Presently, these are considered separate species; however evidence indicates *C. denverensis* and *C. splendida* may be subspecies of *C. splendida*. The most recent literature should be consulted to determine their present status.

***Cicindela purpurea* Olivier 1790:14 (Fig. 12, 42)**

Nebraska subspecies: *Cicindela purpurea auduboni* LeConte 1845:207.

= *C. graminea* Schuapp 1884:89; *C. auguralis* Casey 1913:21; *C. nigerrima* Leng 1918:139.

Cicindela purpurea auduboni has two color morphs. The black morph is all black dorsally and ventrally. The green morph is generally darker and duller than *C. denverensis*. Elytra dark green and may have a dark reflection. Pronotum and head cupreous green. Ventral surfaces: dark metallic blue with green reflection; thorax and head may be all green. Lateral thoracic plates brilliant cupreous red. Maculation: same on both morphs and similar to *C. denverensis*; middle band a bold dash angling posteriorly; apical lunule reduced and apical dot may be present, but not connected.

Range: Central U.S. west to Rocky Mountains, southwestern U.S., Pacific Northwest, Texas to Canada. Nebraska: Western Plains, Pine Ridge. BANNER: McGrew; CASS: no data; CUSTER: Broken Bow; DAWES: Crawford, Crawford (Wood Reserve); DUNDY: Benkelman; GARDEN: Oshkosh; HOLT: no data; KIMBALL: no data; LANCASTER: Lincoln, Roca; MORRILL: no data; SAUNDERS: Cedar Bluffs; SCOTTS BLUFF: Gering, Scottsbluff; SHERIDAN: Rushville; SIOUX: Ft. Robinson, Crawford, Monroe Canyon, War Bonnet Canyon, Toad Stool Park National Monument, Harrison.

Status: A common species in the Pine Ridge and Western Plains; sparsely distributed in the Sand Hills. Found on clay banks, dirt roads, and open paths. Peak populations occur in spring and fall, and it can be moderately abundant. Found with *C. denverensis* and *C. splendida*. The green form is more common than the black form and can be distinguished from *C. denverensis* by the presence of the cupreous pronotum.

Seasonal distribution: February (2), March (28), April (71), May (34), June (7), August (10), September (25), October (10).

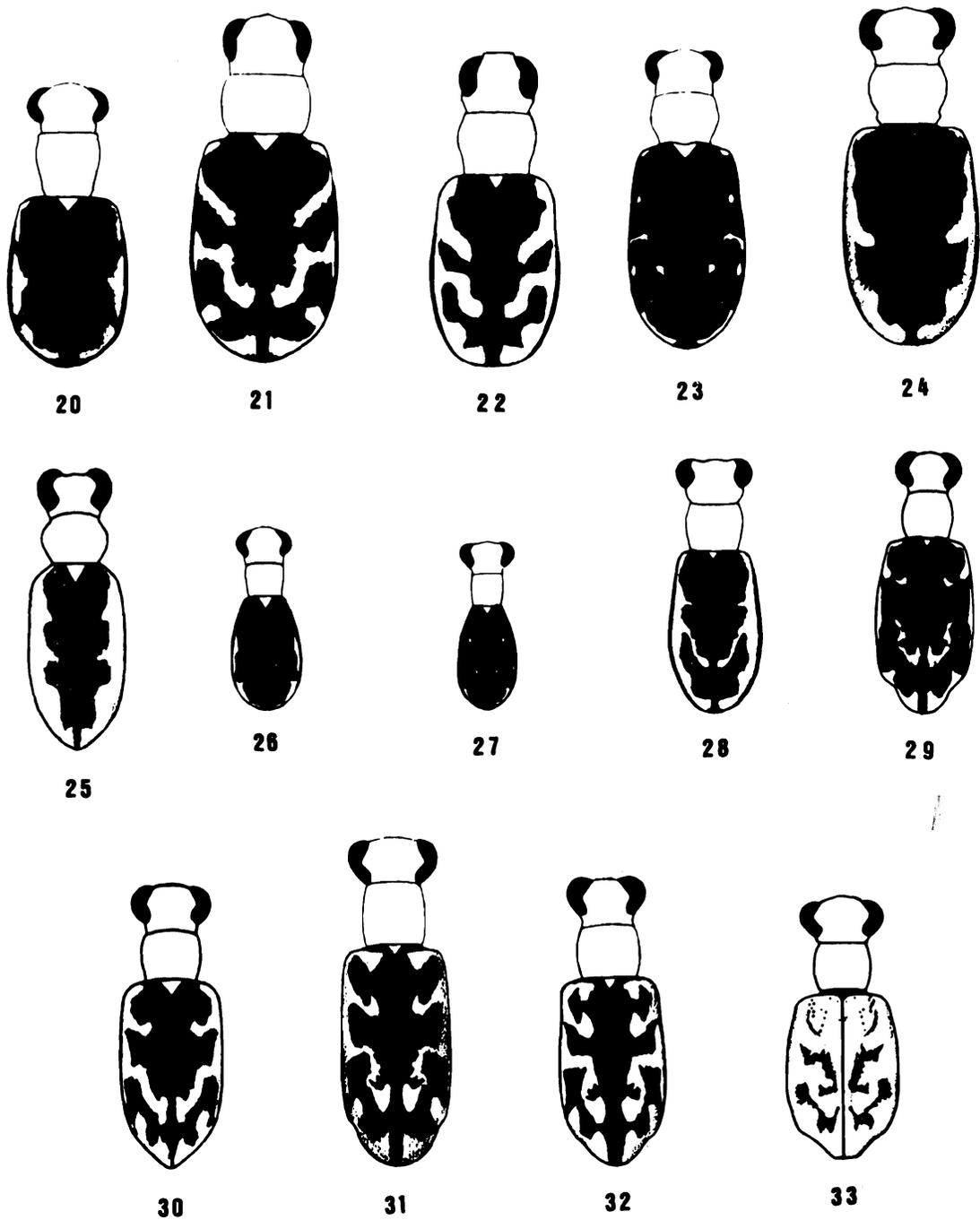
***Cicindela splendida* Hentz 1830:254 (Fig. 13, 44)**

Nebraska subspecies: *Cicindela splendida cyanocephalata* Eckhoff 1939:211.

= *C. splendida cyanocephala* Varas-Arangua 1928:239; *C. splendida cyanocephalanota* Steiskal 1971:34.

Dorsal surfaces: elytra cupreous red, margin may be metallic green or dark blue. Ventral surfaces: generally dark metallic blue but may have a green tint if head and thorax green. Maculation: highly variable, always reduced and may be almost lacking; middle band always lacking except at marginal band, marginal band may be reduced to a dash or extending to elytra suture with oblique bend at knee; humeral band never complete and consists of some combination of humeral dot, post-humeral dot, both, or may be completely missing; apical dot usually present and separated from post-apical dot, which may be missing.

Range: WI, MN, NE, IA, KS. Nebraska: Missouri River and Bluffs, Eastern Plains, Central Plains, Pine Ridge. BANNER: McGrew; BOX BUTTE: Alliance; CASS: Plattsmouth; CHERRY: Valentine, Snake River Falls; DAWES: Chadron, Crawford; DAWSON: Gallagher Canyon; FRONTIER: Frazier Creek, Moorefield, Mayfield; FURNAS: Holbrook; GARDEN: Lisco; GOSPER: Elwood; HOWARD: St. Paul, Dannebrog; JEFFERSON: Fairbury; LANCASTER: Lincoln; LINCOLN: Wellfleet; MORRILL: no data; NEMAHA: Indian Cave State Park; NUCKOLLS: Superior; OTOE: Nebraska City; POLK: Osceola; RICHARDSON: Indian Cave State Park; SALINE: Crete; SARPY: Gretna; SAUNDERS: Ceresco, SCOTTS BLUFF: Gering, Mitchell; SHERIDAN: Rushville; SHERMAN: no data; SIOUX: Harrison, Monroe Canyon; THAYER: Hebron; WAYNE: Wayne; WEBSTER: Guide Rock; YORK: Waco, McCool Junction.



FIGURES 20—33. *Cicindela* species (continued), with average length (mm) given in parentheses. 20. *C. scutellaris scutellaris* (10); 21. *C. tranquebarica* (13); 22. *C. lengi* (12); 23. *C. punctulata* (11); 24. *C. circumpicta* (12); 25. *C. togata* (10); 26. *C. cursitans* (6); 27. *C. celeripes* (6); 28. *C. terricola cincipennis* (9); 29. *C. nevadica lincolniana* (10); 30. *C. nevadica knausi* (9); 31. *C. cuprascens* (11); 32. *C. macra* (10); 33. *C. lepida* (9).

Status: Distributed in the U.S. east of the Rocky Mountains. Habitats in Nebraska include clay banks and other natural or man-made eroded banks; does not occupy banks adjacent to water. Can be very common and apparently colonizes new habitats rapidly; successfully colonizes road cuts and will occupy very small habitats. Suitable habitats are common in the eastern part of the State on the bluffs of the Missouri and Platte rivers, where it commonly occurs with *C. limbalis*. Occurs with *C. denverensis* in the western part of the State in canyons and escarpments, particularly in the Pine Ridge. Reddish-green individuals may be observed in localities where *C. denverensis* and *C. splendida* are present.

Seasonal distribution: February (1), March (78), April (91), May (38), June (2), July (1), September (13), October (9). Active in spring and fall; peak populations in spring. Has been collected as early as February and as late as October. Bright sunny days and an air temperature of approximately 50°F are required for activity.

Cicindela denverensis Casey 1897:297 (Fig. 14, 44)

= *C. graminea* Casey 1913:21; *C. conquista* Casey 1914:357; *C. oreada* Casey 1914:358; *C. plattensis* Smyth 1933:252.

Dorsal surfaces: elytra, pronotum, and head metallic green and may have a reddish tint. Ventral surfaces: metallic blue-green. Maculation: highly variable, always reduced and may be almost completely lacking; middle band present only at marginal band; marginal band may be reduced to a dash or extending to elytral suture with an oblique bend at knee; humeral band never complete and may consist of the humeral dot, post-humeral dot, or both, or may be missing; apical dot usually present and separate from the sub-apical dot, which may be missing.

Range: Western Great Plains, OK, ND, WY, SD, NE, CO, KS, TX. Nebraska: Pine Ridge, Western Plains. BANNER: Bull Canyon, Harrisburg; BOX BUTTE: Alliance; CHASE: Imperial; CHERRY: Valentine; CUSTER: Broken Bow; DAWES: Crawford; DAWSON: Gallagher Canyon; DUNDY: Benkelman; FRONTIER: Frazier Creek, Moorefield, Maywood; GARDEN: Lisco; HITCHCOCK: Trenton; LINCOLN: Wellfleet, North Platte; MORRILL: no data; RED WILLOW: McCook; SCOTTS BLUFF: McGrew, Gering, Scotts Bluff Experiment Station, Mitchell; SHERIDAN: Rushville; SIOUX: Pine Ridge, War Bonnet Canyon, Monroe Canyon, Mitchell, Agate Fossil Beds National Monument, Montrose; THOMAS: Halsey.

Status: Confined to the western half of Nebraska in the same eroded bank and canyon habitats as *C. splendida*. Most often found clinging to vertical faces of hard-packed cliffs, not in areas of loose soil or moderate vegetation. Can be more abundant than *C. splendida* and is active in the spring and fall.

Seasonal distribution: February (5), March (82), April (250), May (155), June (5), October (2).

Cicindela limbalis Klug 1834:29 (Fig. 15, 44)

Nebraska subspecies: *Cicindela limbalis transversa* Leng 1902:131.

Very similar to *C. splendida*, but easily separated by its cupreous red pronotum. Dorsal surfaces: elytra red, margin of elytra may be metallic green or blue; thorax cupreous red, head same color as elytra. Ventral surfaces: generally dark metallic blue but may have greenish tint. Maculation: highly variable, always reduced and may be almost lacking; marginal band always lacking except at middle band, which may be reduced to a dash or extend to elytra suture; humeral band never complete and consists of some combination of humeral dot and post-humeral dot, or is completely missing; apical dot usually present and separated from post-apical dot, which may be missing.

Range: General: IL, MN, SD, NE, IA, KS, MO. Nebraska: Missouri River and Bluffs, Eastern Plains. BURT: Decatur; CASS: Weeping Water, South Bend, Plattsmouth; CEDAR: Hartington; CUMING: West Point; DIXON: Ponca State Park; DODGE: Fremont; DOUGLAS: Omaha, Bellevue; HAMILTON: Marquette; KNOX: Bloomfield; LANCASTER: Lincoln; NEMAHA: Peru, Indian Cave State Park, Brownville; OTOE: Nebraska City; PIERCE: Randolph; POLK: Osceola; SARPY: Gretna; STANTON: Pilger; WASHINGTON: Blair, Ft. Calhoun; YORK: Waco, McCool Junction.

Status: This is the third member of the closely related *C. splendida* - *C. denverensis* - *C. limbalis* complex. Found in the eastern half of Nebraska, overlapping the range of *C. splendida* but not *C. denverensis*. Habitat requirements and seasonal activity same as *C. splendida*. These species often occur together, but pure populations of *C. limbalis* can be found. It does not seem to colonize new habitats as rapidly as *C. splendida* and is more abundant in older, larger, undisturbed habitats.

Seasonal distribution: March (44), April (18), May (11), June (1), July (2), September (3), October (9).

Cicindela sexguttata Fabricius 1775:226 (Fig. 16, 37)

= *C. varians* Ljungh 1799:147; *C. violacea* Fabricius 1801:232; *C. guttata* Emmons 1854:35; *C. harrisii* Leng 1902:128; *C. quadriguttata* Davis 1903:271; *C. levettei* Casey 1909:270; *C. tridens* Casey 1909:271; *C. illinoensis* Mares 1921:310; *C. kansanus* Knaus 1929:24.

Dorsal surfaces: metallic green; some individuals may be purple-blue. Ventral surfaces: metallic green or with bluish hue. Maculation: almost never present; if present, extremely reduced and consisting of only a spot for the middle band and apical lunule.

Range: Widely distributed in the eastern U.S. Nebraska: Missouri River and Bluffs, BOYD, BROWN, CASS, CUMING, DIXON, DOUGLAS, JEFFERSON, KNOX, LANCASTER, NEMAHA, NUCKOLLS, OTOE, PAWNEE, RICHARDSON, SARPY.

Status: Primarily distributed throughout the eastern half of the United States, it reaches the western extension of its range along the Niobrara River in Brown County. Most common in the Missouri Rivers bluffs, where it can be very common in summer on dirt paths in the moist deciduous forests.

Seasonal distribution: May (2), June (66), July (23), August (11), September (1).

Cicindela pulchra Say 1823:142 (Fig. 17, 38)

Dorsal surfaces: elytra brilliant red to dark red with a purple hue; margins of elytra purple, as are margins of head and pronotum. Ventral surfaces: generally purple or purple-blue. Maculation: limited to a dash at the middle band.

Range: Southwestern U.S., Central Plains, and South Central Canada. Nebraska: Western Plains. DUNDY: Haigler, 24-V-1914 L.M. Gates (UNSM); Haigler, 11-VIII-1901, M.A. Carriker (UNSM). LANCASTER: Lincoln, 23-VII-1903, L. Bruner (UNSM).

Status: This large, beautifully colored beetle is distributed primarily in the southwestern U.S. Nebraska records represent the northeasternmost locality known. Last collected in Nebraska in 1914 from Dundy County, near the Kansas and Colorado State lines. This area is dry and hilly and is presently used primarily as pasture. Populations known in nearby Kansas and Colorado suggest it may still occur in Nebraska; additional collecting is required to verify its presence. The record from Lancaster County is dubious.

Cicindela fulgida Say 1823:141 (Fig. 18, 43)

= *C. subnitens* Calder 1922:62.

Dorsal surfaces: generally metallic red, but Lancaster County individuals may vary in degrees from dark red to black. Ventral surfaces: metallic green, but as with dorsal surfaces, Lancaster County individuals vary in degrees to entirely black. Maculation: complete except for lack of marginal band; humeral and lunule bands expanded and extending almost to the middle band and more than halfway to elytral suture.

Range: Southwestern United States to Canada. Nebraska: Eastern Plains, Western Plains. BOX BUTTE: Alliance; DUNDY: Haigler; Benkelman; GARDEN: Oshkosh; LANCASTER: Lincoln; MORRILL: Bridgeport, Bayard; SAUNDERS: Ceresco (Jack Sinn Wildlife Management Area (WMA)); SCOTTS BLUFF: Melbeta; SHERIDAN: Antioch.

Status: Inhabits saline flats in two distinct regions of Nebraska. In the east it is found in the remnants of the large salt basins around Lincoln. Considered by Willis (1967) to be color variants of the nominate race, the Lancaster County populations may be relic forms (Knudsen 1985). Populations in the western parts of the State inhabit saline ditches and ponds of the Sand Hills and Western Plains. The color of the Lancaster County beetles may be affected by two factors. Some tend to be bright metallic red following emergence, but darken with age (Willis 1967). However, darkly colored teneral individuals suggest a portion of the population may emerge with darker coloration. The result is a population with intergrades of color ranging from red to completely black (except for maculation). Active in spring and fall; due to more collecting in summer months, the seasonal distribution data do not reflect this.

Seasonal distribution: April (3), May (60), June (59) July (72), August (55), September (11) October (3).

Cicindela scutellaris Say

Two subspecies occur in Nebraska. *Cicindela s. scutellaris* is distributed in the western half of the United State to the Rockies and is found in the western two thirds of Nebraska. *Cicindela s. lecontei* occurs in the eastern third of Nebraska and eastward across the United States. The dividing line between the subspecies is ambiguous, but is generally south to north from Thayer Co. to York Co. along the eastern edge of the Sand Hills.

Key to the subspecies of *Cicindela scutellaris* Say:

1. Elytra red lacking maculation, pronotum and head green,
western Nebraska distribution *C. s. scutellaris* Say

2. Elytra red or green maculated, pronotum, same as elytra, eastern
Nebraska distribution *C. s. lecontei* Haldeman

a. *Cicindela scutellaris scutellaris* Say 1823:140 (Fig. 19, 39)

= *C. billingsi* Casey 1924:14; *C. shantzi* Casey 1924:14.

Dorsal surfaces: elytra brilliant red, sometimes with anterior and marginal portions green or reddish green. Head and pronotum vibrant green or green with bluish tint. All ventral surfaces dark purple, sometimes with green tint on posterior portion of the abdomen. Maculation lacking. *Cicindela s. scutellaris* - *C. s. lecontei* intergrades have a reduced triangular middle band and the apical lunule may be present.

Range: Nebraska west to Rocky Mountains; ND to TX. Nebraska: Sand Hills, Western Plains, Pine Ridge. ANTELOPE, ARTHUR, BOX BUTTE, BROWN, CHASE, CHERRY, CHEYENNE, DAWES, DUNDY, GARDEN, GRANT, HOOKER, HOWARD, JEFFERSON, LINCOLN, McPHERSON, MORRILL, NUCKOLLS, SCOTTS BLUFF, SHERIDAN, SIOUX, STANTON, THOMAS, WEBSTER, YORK.

Status: Prevalent in the Sand Hills and the eroded banks of the Western Plains and Pine Ridge. Preferred habitats are open areas with sparse vegetation. Often found with *C. lengi* and *C. formosa*. Active in spring and fall, but never extremely abundant.

Seasonal distribution: April (57), May (38), June (10), July (15), August (15), September (52).

b. *Cicindela scutellaris lecontei* Haldeman 1853 (Fig. 20, 39)

Color highly variable; many color combinations may be found in a single population. Elytra, pronotum, and head generally the same color, but combinations of dark green, red, bright green or red, or greenish red may be encountered. Generally duller than the western subspecies. Maculation: variable, may include a complete humeral lunule, connected and expanded marginal band, and an apical lunule; middle band always reduced to a triangular dash or missing; most beetles have a post-humeral dot, triangular middle band, and a developed apical lunule.

Range: Nebraska east to Atlantic Coast. Nebraska: Eastern Plains. ANTELOPE, CASS, CUMING, DOUGLAS, JEFFERSON, LANCASTER, NUCKOLLS, SAUNDERS, YORK.

Status: Distributed in the Eastern Plains of Nebraska, in open and generally dry, sandy, eroded blowouts or stream-deposited sandy areas, but away from the water's edge. Can be very abundant in spring and fall. Often found with *C. formosa*, *C. tranquebarica* and *C. punctulata*.

Seasonal distribution: April (88), May (40), June (3), July (1), September (18), October (14).

Cicindela tranquebarica Herbst 1806:178 (Fig. 21, 41)

= *C. vulgaris* Say 1818:409; *C. obliquata* Dejean 1825:72; *C. horiconensis* Leng 1902:145; *C. minor* Leng 1910:80; *C. vulgaris minor* Harris 1911:18; *C. crinifrons* Casey 1913:9; *C. turbulenta* Casey 1913:25; *C. wichitana* Casey 1914:21; *C. viridula* Varas-Arangua 1927:173.

Dorsal surfaces: elytra dark brown; margins and sutures of head and pronotum may be metallic green. Ventral surfaces: abdomen may be metallic green, blue, or bluish green. Lateral plates of thorax brown with a reddish hue. Maculation: complete and usually bold; humeral lunule extending towards elytral suture; marginal band not connected to apical or humeral lunules.

Range: Widely distributed across the United States. Nebraska: All. ARTHUR, BANNER, BOX BUTTE, BROWN, CHERRY, CUMING, CUSTER, DAWES, DODGE, DOUGLAS, DUNDY, FRANKLIN, GARDEN, GRANT, HITCHCOCK, HOWARD, JEFFERSON, KNOX, LANCASTER, McPHERSON, POLK, SIOUX, SCOTTS BLUFF, THOMAS, WEBSTER, YORK.

Status: A common spring-fall species; widely collected in Nebraska; occupies a diverse range of open sunny habitats such as sand blowouts, dry edges of sandy rivers, saline ponds in the Sand Hills, open paths and trails. Can be common, but never extremely abundant. Sometimes occurs with *C. repanda* in moist habitats.

Seasonal distribution: March (16), April (64), May (35), June (9), July (3), August (13), September (22), October (7).

Cicindela lengi Horn 1908:738 (Fig. 22, 38)

= *C. venusta* LeConte 1848:179; *C. gracileta* Casey 1913:25.

Dorsal surfaces: elytra, pronotum, and head red to reddish brown. Margins and sutures of pronotum and head may be dark green. Maculation: similar to *C. formosa*, but not as expanded; humeral lunule elongated and extending close to the elytral suture.

Range: Central Plains, NM, OK, IA, CO, KS, MO. Nebraska: Sand Hills, Pine Ridge. ANTELOPE: Neligh; BOX BUTTE: Alliance; CHERRY: Dewey Lake, Valentine; CHEYENNE: Sidney; CUSTER: Broken Bow; DAWES: Rushville; DUNDY: Benkelman, Haigler; GARDEN: Lisco, Oshkosh; GRANT: Hyannis; HALL: Cairo; HAMILTON: Archer; HOLT: no data; HOWARD: Dannebrog; LINCOLN: Bradley Island; LOGAN: Stapleton; MORRILL: Bridgeport; SHERIDAN: Hay Springs, Antioch, Lakeside, Dunlap; SIOUX: Harrison; STANTON: no data; THOMAS: Halsey.

Status: Not widely distributed; near its eastern distributional limits in Nebraska, most abundant in the Sand Hills. Found on eroded banks in the Pine Ridge and sporadic in sandy deposits in the Western and Eastern Plains regions. Suitable habitats have moderate amounts of vegetation or open areas adjacent to vegetation. Most common in spring, but has been collected in summer. Generally active earlier in the year than *C. formosa*. Closely resembles *C. formosa*, but is smaller and has a longer humeral band and wider labrum.

Seasonal distribution: April (25), May (54), June (37), July (23), August (38), September (3).

Cicindela punctulata Olivier 1790:27 (Fig. 23, 40)

= *C. micans* Fabricius 1798:46; *C. obscura* Melsheimer 1806:55; *C. jenisoni* Gistel 1837:55; *C. boulderensis* Casey 1909:271; *C. prolixa* Casey 1916:33.

Dorsal surfaces: elytra generally dark black, rarely green or blue. Pronotum and head usually same color as abdomen, but lighter; may be brown, brownish green, or brown with a reddish tint. Ventral surfaces: dark or bright purple; lateral plates bronze or cupreous red. Maculation: always reduced or absent; when present, the maculation may consist of the post-humeral dot, a broken marginal band present only below the interrupted middle band; apical band always reduced to a faint marking, sometimes connected to the sub-apical dot.

Range: Widely distributed east of the Rocky Mountains and in the Southwest. Nebraska: All. ANTELOPE, BANNER, BOX BUTTE, BUFFALO, CASS, CHASE, CHERRY, CHEYENNE, CUMING, DAKOTA, DAWES, DAWSON, DIXON, DOUGLAS, DUNDY, HITCHCOCK, FRANKLIN, FILLMORE, GAGE, HALL, HAMILTON, KEITH, LANCASTER, LINCOLN, LOGAN, McPHERSON, MORRILL, NUCKOLLS, OTOE, PLATTE, RED WILLOW, RICHARDSON, SARPY, SAUNDERS, SCOTTS BLUFF, SHERIDAN, SIOUX, THAYER, THOMAS, WAYNE, WEBSTER.

Status: The most ubiquitous *Cicindela* species in Nebraska, present in all types of habitats. Active in all warm months and usually very abundant. Attracted to lights. The eastern subspecies occurs in Nebraska and is characterized by its dull black coloration. Green or blue specimens are occasionally found.

Seasonal distribution: June (36), July (176), August (100), September (21), October (8).

Cicindela circumpecta LaFerte 1841:39 (Fig. 24, 43)

Nebraska subspecies: *Cicindela circumpecta johnsoni* Fitch 1856:487.

= *C. ambiens* Casey 1913:33; *C. salinae* Vaurie 1951:3.

Dorsal surfaces: elytra dull dark red, brown, or brownish black. Ventral surface: metallic green. Maculation: marginal band expanded and fused with apical and humeral lunule; middle band reduced reaching only to knee.

Range: Central Plains; Texas Gulf Coast. Nebraska: Eastern Plains, Western Plains. LANCASTER: Lincoln, Ceresco; NUCKOLLS: no data; SCOTTS BLUFF: Melbeta.

Status: One of four species (*C. circumpecta*, *C. togata*, *C. nevadica lincolniana*, and *C. fulgida*) commonly found on saline flats in Lancaster County. Considered a separate subspecies until 1967 because of its small size and dull brown or red elytra. Willis (1967), following comparison with populations in Kansas, Missouri, and North Dakota, decided the Lancaster County populations were insufficiently distinct to warrant subspecific status. Recorded from three Nebraska localities, but the Nuckolls County record is not confirmed. In Lancaster County can be found in two sites (see *C. togata* for locations), where they are active in summer, are very abundant, and commonly are interspersed with *C. togata*. Generally occupies drier areas of the salt flats. The third locality is a recent record (1985) from Scotts Bluff County near Melbeta. Previous extensive collecting did not record this species there, suggesting that these populations are new. The beetles in this population have a bright elytral reflection and approximately five percent have green elytra; no individuals were dark red. The Scotts Bluff County population is more likely of Kansas origin than of Lancaster County origin (D. Brzoska pers. comm., Lawrence, KS).

Seasonal distribution: June (241), July (94), August (8), September (6).

Cicindela togata LaFerte 1841:40 (Fig. 25, 43)

Nebraska subspecies: *Cicindela togata globicollis* Casey 1913:35.

= *C. apicalis* Horn 1897:17; *C. latilabris* Willis 1967:286.

Dorsal surfaces: dark olive green to greenish brown. Ventral surfaces: dark green, but extensively clothed by white hairs on the most ventral portions. Maculation: humeral lunule, marginal band, and apical lunule connected and expanded; middle band reduced to a dash, extending only slightly over half the distance to the elytral suture.

Range: Central Plains, Gulf Coast. Nebraska: Eastern Plains. DODGE: no data. FILLMORE: no data; LANCASTER: Lincoln (Salt Lake), Ceresco (Jack Sinn WMA); NUCKOLLS: no data; SAUNDERS: no data.

Status: Occupies saline habitats in the United States. Recorded from five Nebraska counties, but confirmed in only one. In Lancaster County, three areas support populations. Two are near Lincoln, one along I-80 near the airport and the other on the east side of North 27th St. beyond the city limits. These are remnants of a much larger salt basin and are largely drained and filled. The Jack Sinn WMA records are from saline areas adjacent to Highway 77 on the Lancaster-Saunders County line. Active in the summer and can be very abundant. Prefers the drier areas of the salt flats.

Seasonal distribution: June (166), July (77), August (36), September (9).

Cicindela cursitans LeConte 1857:60 (Fig. 26, 40)

= *C. alata* Liljebblad 1932:215.

Dorsal surfaces: elytra drab olive green or brown. Head and pronotum generally the same color as the elytra, however, in some individuals the head may be a brighter green. Ventral surfaces: dark with a green tint. Maculation: marginal band connected to or extending almost to the expanded apical lunule. Middle band always reduced to dash extending from the marginal band with a separated dot lying close to the elytral suture. Post-humeral dot may be present in a few beetles.

Range: Eastern Central Plains, Southeast U.S. to North Dakota. Nebraska: Missouri River and Bluffs, Eastern Plains, Western Plains. CUMING: West Point; DAKOTA: South Sioux City; DOUGLAS: Omaha; DUNDY: Laird; HITCHCOCK: Culbertson;

HOLT: Spencer Dam; MORRILL: Northport; SARPY: Bellevue; SCOTTS BLUFF: Scottsbluff.

Status: This small nondescript beetle occurs across the State and is more common than the similar-sized *C. celeripes*. Found in moist ditches in the eastern part of the State, and in the Western Plains in moist and saline ditches; can be moderately abundant. Flightless, but runs very rapidly.

Seasonal distribution: June (50), July (84), August (19).

Cicindela celeripes LeConte 1848:183 (Fig. 27, 40)

Dorsal and ventral colors almost identical to *C. cursitans*; elytra, thorax, and head drab olive green or brown; ventral surfaces: dark brown with bronze or green hue. Maculation: similar to *C. cursitans*, except marginal band much reduced and not continuous with apical lunule; four solitary dots, the discal and post-humeral dots, complete the maculation.

Range: Central Plains: IL, IN, OK, TX, NE, IA, KS. Nebraska: Missouri River and Bluffs; CASS: South Bend; Louisville; CUMING: West Point; DAKOTA: South Sioux City; DOUGLAS: Omaha; FILLMORE: Fairmont; LANCASTER: Lincoln.

Status: A small, flightless beetle, it has not been collected in Nebraska since 1915. Probably occurs in the State, but overlooked because of its small size. Similar in appearance and seasonal occurrence to *C. cursitans*, but not as widely distributed. Apparently confined to the eastern section of the State along the rivers systems; most specimens collected "from hilly prairie land near the Missouri River" (Eckhoff, 1939).

Seasonal Distribution: June (64), July (116), August (1).

Cicindela terricola Say

Confusion exists concerning the taxonomic status of this species. Consistent with the current checklist (Boyd et al., 1982), a single species and a geographical form are listed. Further investigation is warranted to determine the correct status of this group. Most specimens in the University of Nebraska collection are *C. t. cinctipennis*. Most of the information on *C. terricola* is derived from the collecting records and notes of D. Eckhoff. County and locality information is supplied for both forms under the information on *C. t. cinctipennis*.

Key to the subspecies of *Cicindela terricola*:

1. Lacking or with limited maculation; dull black *C. terricola* Say
2. Well maculated, or green or black . . . *C. t. cinctipennis* LeConte

a. ***Cicindela terricola*** Say 1824:269

= *C. pusilla* Say 1817:21; = *C. sayanella* Casey 1914:19.

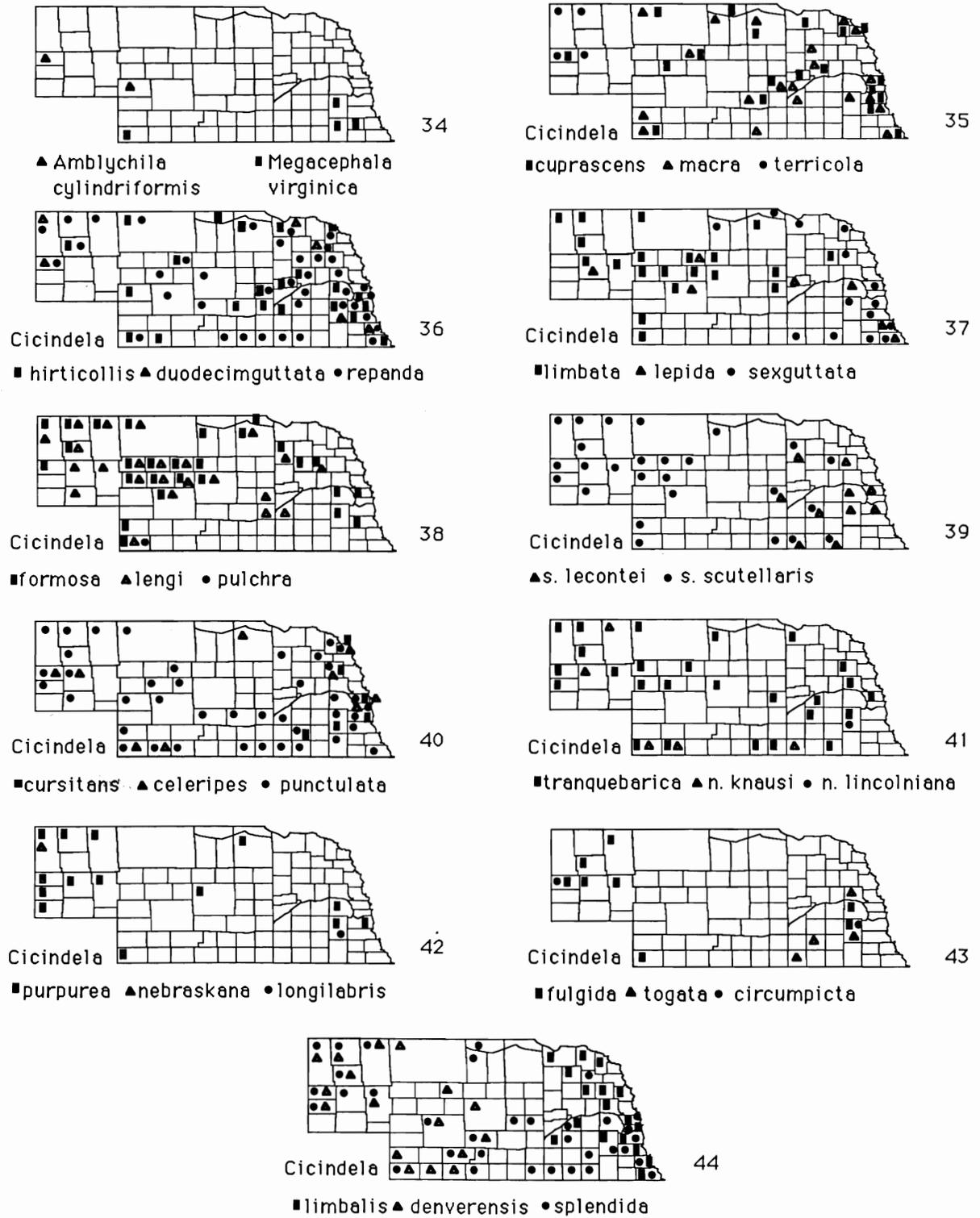
Dorsal and ventral surfaces: dull black. Maculation: limited; a reduced humeral and apical lunule may be present.

Range: Northwestern Great Plains, MB, ND, MN, SD, NE, IA, CO. Nebraska: Western Plains, Pine Ridge.

Status: The two forms that are treated as one species by Boyd et al. (1982) may actually represent two species: *C. terricola* and *C. pusilla* (R. Huber pers. comm., Kansas City, KS). *C. terricola* is sooty black; *C. pusilla* is chocolate brown, green ventrally, and may be maculated. Providing the later subspecies is valid, then *C. terricola*, *C. pusilla*, and *C. p. cinctipennis* should be recognized.

The habitat of the *C. terricola* type and the non-maculated type (*C. pusilla*) is generally saline ditches and small saline flats in the Platte River valley in the Western Plains. Individuals of these two types are not common in the Pine Ridge, where the *C. t. cinctipennis* type is more common. Habitats in the Pine Ridge do not appear to be as saline as those in the Platte River valley, indicating that soil conditions may significantly affect the distribution of this species.

Seasonal distribution: *C. terricola* types: July (42), August (17). *C. pusilla* types: June (48), July (30), August (22).



FIGURES 34—44. Ranges of Nebraska Cicindelidae.

b. *Cicindela terricola cinctipennis* LeConte 1848:182 (Fig. 4, 35)= *C. cyanella* LeConte 1857:46.

Dorsal surfaces: elytra, thorax, and head dark green with bronze reflections or entirely bronze. Ventral surfaces: metallic green, and those of thorax and head may have a bronze reflection. Maculation: marginal band, humeral, and apical lunule connected; humeral lunule angles posteriorly half way to elytral suture; middle band complete and almost reaching elytral suture, but lacking a sharp bend at knee.

Range: Western Great Plains, AZ, NM, UT, AB, SK, MT, WY, Nebraska; Western Plains, Pine Ridge. DAWES: Chadron; MORRILL: Bayard; Northport; SCOTTS BLUFF: Melbeta, Scottsbluff, McGrew, Mitchell; SIOUX: Toadstool Park, Hat Creek Valley, War Bonnet Canyon.

Status: Best separated from the other types in this group by the well-developed maculation. Seems to have different habitat requirements: collected from beds of ephemeral, non-saline streams such as Hat Creek and in the Pine Ridge and Toadstool Park along stream beds in which the surface was moist but lacked running water. Peak populations occur in June.

Seasonal Distribution: May (1), June (62), July (3), August (34).

Cicindela nevadica LeConte

Key to the subspecies of *Cicindela nevadica*:

1. Occurring in Lancaster County; elytra dark brown or green, maculation reduced and occasionally faint *C. n. lincolniana* Casey

2. Occurring in western Nebraska; elytra olive green, maculation distinct *C. n. knausi* Leng

a. *Cicindela nevadica lincolniana* Casey 1916:32 (Fig. 29, 41)

Dorsal surfaces: elytra brown or dark olive green; head and pronotum dark brown, tending to green on individuals with a green elytra. Ventral surfaces: all dark green and reflective. Maculation: humeral lunule, marginal band, and apical lunule connected; middle band complete when present, but may be faint.

Range: Endemic to Lancaster County. LANCASTER: Lincoln (Salt Lake), North 27th Street.

Status: Endemic to the salt flats of Lancaster County and found only in the wettest mud areas adjacent to the small streams that drain the flats. Large numbers of specimens in the University of Nebraska collection indicate this species was once extremely abundant. Draining and filling of the salt basin has severely reduced populations. Beetles are known from two sites, along I-80 near the Lincoln airport and along a small stream south of the North 27th St. site (see *C. circumpecta* discussion). Peak populations occur in late May and early June, although many individuals have been collected in July.

Seasonal distribution: May (42), June (78), July (73).

b. *Cicindela nevadica knausi* Leng 1902:166 (Fig. 30, 41)

Dorsal surfaces: olive green or bronze. Ventral surfaces: metallic green. Maculation: similar to *C. n. lincolniana*, but bolder and not reduced.

Range: Western Great Plains, Texas to Canada. Nebraska: Western Plains. BOX BUTTE: Alliance; DUNDY: no data; HITCHCOCK: no data; MORRILL: Northport, Bayard; NUCKOLLS: no data; SHERIDAN: Lakeside.

Status: Restricted to moist ditches and pond edges in the Western Plains and Sand Hills. Nebraska is the northeastern extension of the range limits; most common in the U.S. southwest. The actual distribution of this species in the Sand Hills is vague due to the remoteness of ponds and limited collecting in this area.

Seasonal Distribution: June (42), July (58), August (73).

Cicindela cuprascens LeConte 1852:65 (Fig. 31, 35)= *C. annicola* Casey 1913:37; *C. mundula* Casey 1913:37.

Dorsal surfaces: elytra olive green or bronze brown, highly reflective due to the deep punctures on the surface of the elytra. Ventral surfaces: similar to dorsal color, but may tend to be more green. Maculation: complete, with marginal band, apical and humeral lunule connected; humeral and apical lunules c-shaped and bold; knee of middle band extending close to elytral suture and bending sharply posterior; foot of middle band extends well posteriorly and terminates in a globular shape at margins of elytral suture.

Range: General: Central United States. Nebraska: Missouri River and Bluffs, Eastern Plains, Western Plains. BUFFALO: Pleasanton; CHERRY: no data; CASS: no data; DAKOTA: South Sioux City; DIXON: no data; DOUGLAS: no data; DUNDY: Laird, Haigler; HOLT: Spencer Dam; HOWARD: Dannebrog; KEYA PAHA: no data; KNOX: Niobrara; McPHERSON: Gudmundsen Field Laboratory; NANCE: Loup River, Genoa; OTOE: Nebraska City; PLATTE: no data; RICHARDSON: Indian Cave State Park; SAUNDERS: Ashland; SCOTTS BLUFF: Scottsbluff; THOMAS: No data.

Status: *Cicindela macra* and *C. cuprascens* are morphologically similar, occupy similar habitats, and are distributed across the central U.S. from Texas to Canada. The information contained in the discussion section of each species applies to both. Records do not indicate that large populations ever existed in the State, and these species are not now common in Nebraska, but they may have been more common earlier in the century. Channelization of the Missouri River and reduced flow due to irrigation demands on the Platte River and its tributaries may have eliminated many populations. Large areas of fine sand deposits, required habitat for oviposition and larval development (C. B. Knisley, pers. comm., Atlee, VA), may have been eliminated by reduced water flow.

Seasonal Distribution: June (6), July (20), August (11).

Cicindela macra LeConte 1857:50 (Fig. 32, 35)= *C. mercurialis* Casey 1913:36; *C. topekana* Casey 1916:31.

Dorsal surfaces: olive green or dull green due to shallow punctures on the elytra. Ventral surfaces: similar to dorsal coloration, but may tend to be darker and greener. Maculation: complete and similar to *C. cuprascens*, but not as bold; marginal band, apical, and humeral lunule connected; humeral and apical lunules c-shaped and bold; knee of middle band extending close to elytral suture and bending sharply posterior; foot of middle band well posterior on elytra and at termination extending anteriorly at margins of elytral suture; middle band distal to knee "fishhook-shaped."

Range: Central Plains north of Arkansas; Ohio to Wyoming. Nebraska: Missouri River and Bluffs, Eastern Plains, Western Plains. BROWN: Hogans Bridge; BUFFALO: Pleasanton; CHASE: no data; CHERRY: no data; CASS: Louisville; DAKOTA: South Sioux City; DIXON: Maskell; DOUGLAS: no data; DUNDY: Laird, Haigler, Benkelman, Parks; FRANKLIN: Bloomington; HAMILTON: no data; HOLT: Niobrara; Spencer Dam; HOWARD: Dannebrog; LANCASTER: Lincoln; MERRICK: no data; NANCE: Loup River, Genoa; OTOE: Nebraska City; PLATTE: no data; RICHARDSON: Rulo; SARPY: Two Rivers State Park; SAUNDERS: Ashland; THOMAS: No data.

Status: *Cicindela macra* and *C. cuprascens* prefer sandy habitats along rivers. Daylight collecting by the author has not revealed large populations of either species. Light trapping did prove moderately successful in several localities, but large numbers of either species were not collected. Only one individual (*C. macra*) was collected on the Platte River despite extensive searches along its entire length. This suggests these species may be confined largely to habitats along the Loup rivers.

Cicindela macra and *C. cuprascens* are difficult to separate. While other characteristics should be checked, *C. macra* is dull and *C. cuprascens* is highly reflective.

Seasonal Distribution: June (34), July (132).

Cicindela lepida Dejean 1831:255 (Fig. 33, 37)

= *C. insomnis* Casey 1913:35.

Dorsal surfaces: elytra largely maculated and appearing white, elsewhere coppery brown. Ventral surfaces: dark green. Maculation: extremely expanded, almost covering the entire elytra.

Range: Widely distributed east of the Rocky Mountains; Southwest U.S., Nebraska: Missouri River and Bluffs, Sand Hills. CHERRY: Clear Lake; DUNDY: Parks; LANCASTER: Lincoln; LINCOLN: North Platte; MORRILL: Northport, Redington; NANCE: Genoa; RICHARDSON: Indian Cave S.P.; SAUNDERS: Cedar Bluffs; THOMAS: Seneca; Halsey.

Status: A small "ghostlike" species, its small size and cryptic coloration make it difficult to detect. Prefers dry, white, sandy habitats; not very abundant, but has been found in several locations in Nebraska, indicating a wide distribution; most common in the Sand Hills, but records are sporadic.

Seasonal Distribution: April (1), June (4), July (70), August (2).

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