NEW HOST AND HABITAT ASSOCIATIONS FOR SOME ARIZONA PENTATOMOIDEA AND COREIDAE

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ABSTRACT

Host plant and habitat associations are reported for 62 Arizona Heteroptera: one acanthosomatid, 12 coreids, one cynid, 42 pentatomids, three scutellerids and three threecorids. At least 90 new breeding hosts are documented; the first known hosts are reported for at least nine species. Seven species are reported from Arizona for the first time, and Piezogaster sparsus (Stål) (Coreidae) is recorded from the United States. An undescribed species of Trichopepla sp. (Pentatomidae) is also reported. Several new parasitoid associations are recorded.

INTRODUCTION

Our knowledge of the taxonomy and ecology of the Heteroptera of the southwestern United States is poor (Schaefer 1990). The first significant documentation of the heteropterous fauna in Arizona began with the University of Kansas expeditions in the first decade of this century (Snow 1904, 1905, 1906). Herbert Ruckes, J. R. de la Torre-Bueno, P. R. Uhler and E. P. Van Duzee subsequently contributed much to our present knowledge of Arizona Heteroptera (see Henry and Froeschner 1988).

The geography, topography, and geology of Arizona combine to provide a very diverse environment that supports a correspondingly diverse flora and fauna. Within its political boundaries, biotic communities range from alpine tundra to Sonoran Desert scrub (see classification system of Brown 1982). Most of the included information is from southeastern Arizona, which can be generally characterized as lower Sonoran Desert and Semidesert Grassland, punctuated by small mountain ranges, some of which reach the Canadian Life Zone. Due to their long isolation, these mountains support a wide variety of animal and plant species. The extension of the Sonoran Desert into much of southern and southwestern Arizona results in the unique occurrence of associated species into this area of the United States. Eight species of pentatomids have been described from specimens collected in this state, and six are not known to occur elsewhere (Henry and Froeschner 1988). Some hosts and habits of a few common Arizona pentatomids are fairly well known because of

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their economic importance (e.g., Russell 1952, Butler and Werner 1960) or are common eastern species that range into Arizona. However, nothing is known about the ecology of most southwestern Heteroptera.

Modern advances in systematics of some pentatomids have aided me in locating and identifying many species. Recent taxonomic revisions have contributed significantly to knowledge of the pentatomoid and coreid taxa of the Southwest (e.g., Brailovsky, 1975, Rider 1986; Rider and Chapin 1992; Rolston 1972, 1974; Thomas 1981, 1985, 1992). This report is an initial attempt to present new knowledge of the host plants, habitats, and distribution of certain Acanthosomatidae, Coreidae, Cydnidae, Pentatomidae, Scutelleridae, and Thyreocoridae in Arizona. Some biological and behavioral observations are presented.

MATERIALS AND METHODS

The principal purpose of this study was to determine the breeding hosts of phytophagous species, and to accumulate new collection and habitat data. The information reported here was accrued mainly during 1988-1992, largely in southeastern Arizona, particularly Pima County. Techniques consisted of sampling all vegetation types using a 38-cm sweep net and by visual examination of plants. Nymphs of some species were reared to adults in the laboratory, usually on plant species from which they were collected. Most of the insects and plant samples were returned to a laboratory for confirmation of identification. Plant species were identified by myself and by Thomas Johnsen. Ultraviolet (UV) light catch records were used where records of certain species are scanty.

Only previously unreported host plant and distribution records are presented for certain well-studied pest species. In some cases, previously published host records are included to confirm or question reported plant and habitat associations. References to the biology and ecology of northeastern pentatomids that also occur in Arizona are well covered by McPherson (1982). Thus, references by previous authors to the distribution and ecology of certain species is generally limited only to references considered pertinent. For most host plant records reported, numbers and life stages of the insect are presented. However, since all possible individuals sampled were not collected or recorded, general information on life stages present at some sampling sites is given. An attempt has been made to describe the habitat and plant communities associated with many of the collections reported. Wherever specific biotic communities are mentioned, terms refer to those summarized in Brown (1982). Authorities used for plant identifications were Bailey and Bailey (1976) for ornamentals, Benson and Darrow (1981) for certain desert species, and Kearney and Peebles (1964) in general. Plant names follow Lehr (1978). In some cases, other widely accepted or locally familiar Latin and common names are included to prevent confusion. Plant specimens are in the collection of T. Johnsen and myself. In most cases, insect specimens representing all records were mounted and properly labelled to include host plant, and are currently in my collection. Insect taxa are arranged alphabetically.

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RESULTS

ACANTHOSOMATIDAE
Elasmucha cordillera Thomas

Alnus oblongifolia Torr. (Betulaceae), Arizona alder: Pima Co., Santa Catalina Mtns., Summerhaven, 2331 m, 25-VI-90, twelve adults, some mating, on a single heavily fruiting tree, one female guarding a mass of 54 green eggs on a leaf undersurface; same site (tree), 26-VI-90, ten adults, one egg mass on leaf top with no guarding adult; same site, 17-VII-90, one cohort of 1st instars, no adults present; same site, 8-VIII-90, one female brooding cohort of 1st instars, one large cohort of 1st instars on fruit, and one large cohort of 2nd instars under a leaf.

Mixed vegetation: Pima Co., Santa Catalina Mtns., Bear Cyn., 1770 m, 16-VI-89, one female along a riparian zone within a ponderosa pine forest.

This species was recently described from specimens collected in Mexico, Guatemala and New Mexico (Thomas 1991), but no host plants were reported. Eggs deposited in the laboratory were spindle shaped, pastel green and deposited in irregular rows on the undersides of host leaves. Females remained over the eggs until after eclosion.

COREIDAE
Coreinae
Acanthocephala thomasi (Uhler)

Agave palmeri Engelm. (Agavaceae): Pima Co., Santa Rita Exp. Rng., 28-V-89 and 11-VI-89, 1280 m, clusters of adults on flower buds; 5 km NW of Greaterville, 1300 m, 3-IX-89, adults abundant and clustered on green seed pods; Santa Cruz Mtns., Sawmill Cyn., 1300 m, 20-VIII-91, several adults and 1st-3rd instars on leaves, fruiting stalks, and green fruits in mesquite-grassland; Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 17-VI-89, several adults clustered on flower buds.

Agave schottii Engelm. (Agavaceae), Schott's agave: Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 16-VII-90, 4th-5th instars, two adults on fruiting stalks.

Baccharis sarothroides A. Gray (Compositae), desert broom: Pima Co., Madera Cyn., 13-VII-90, 1180 m, seven adults (two mating pairs); 13-VIII-91, 13 eggs, ca. twenty 3rd instar nymphs and more than 200 adults within a 100m² grassy area dominated by mesquites. Eggs were deposited singly, each on different plants. Most adults were on the lower parts of main stems, usually in pairs but sometimes in groups of 3-8, such groups usually consisting of females with a single male. One very large shrub harbored 77 adults in three main groups, many mating. Nearly all nymphs observed were in company of adults. At the same site on 20-VIII-91, three eggs, several 3rd-4th instars, and a few adults were observed.


Yucca elata Engelm. (Agavaceae), soap tree yucca: Pima Co., Santa Rita Mtns., Florida Cyn., 1350 m, 27-VII-90, 3rd-5th instars, mating adults; Box Cyn., 1300 m, several large nymphs and mating adults on flowers and fruits of a single isolated plant.
UV light: Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 30-VI-90, three adults.

Described from Arizona; the only previous host record for *A. thomasi* was by Palmer (1987), who reported adults were rarely taken on *Baccharis neglecta* Britton, without specific location. The *Acanthocephala* sp. recorded by Waring and Smith (1987) on *A. palmeri* near Tucson is undoubtedly *A. thomasi*, as is Gentry's (1972) reference to fruit damage of *A. palmeri* by "the large, sap-sucking bugs of the family Coreidae observed on the plants" in adjacent Sonora, Mexico.

*Catorhinta selector selector* Stål

*Boerhaavia coccinea* Mill. (Nyctaginaceae), red spiderling: Pima Co., Santa Catalina Mtns., Molino Cyn., 1300 m, 7-X-89, eggs, nymphs, adults; Tucson, 720 m, 8-X-89, nymphs, adults abundant; same site, 11-IX to 30-X-90, eggs, nymphs, adults.

The compact egg mass is attached in an unusual manner near the stem apex. The first few dark reddish brown elongate eggs are glued side by side, attached to the stem on their sides, nearly midway from egg cap to bottom. Subsequent eggs are deposited on the initial egg layer, resulting in a mass that appears to be attached sideways. Most of the egg masses collected were parasitized by a *Gryon* sp. (Hymenoptera: Scelionidae). The gray nymphs are not gregarious. Bibby (1961) recorded *C. selector* from "Boerhaavia sp." in Maricopa County. Torre-Bueno (1942) reported that *C. selector* prefers *Ambrosia* (as *Franseria*) *ambrosioides* (Compositae) in Arizona. Schaefer and Mitchell (1983) also report this species on *Boerhaavia*. I found this insect to be common wherever *B. coccinea* occurs.

*Chelinidea vittiger* Uhler

*Agave palmeri* Engelm. (Agavaceae): Cochise Co., Texas Cyn., 16-X-89, one adult on leaf in chapparal; Pima Co., Santa Rita Mtns., Sawmill Cyn., 1300 m, 20-VIII-91, five adults on leaves of a single nonfruiting plant under a mesquite; 16 km N of Sonoita, 18-V-89, two adults at base of leaves in grassland; 2 km W of Colossal Cave, 6-VI-89, one adult. No cacti occurred in the habitats of the first two records.

*Mammallaria* spp. (Cactaceae), pine cusion cactus: Pima Co., Arizona-Sonora Desert Museum, 16-V-90, nymphs and adults damaging several species and varieties in a cactus nursery.


*C. vittiger* is a well-known species breeding primarily on *Opuntia* spp. (Hunter et al. 1912, Hamlin 1924, Mann 1969, Devol and Goeden 1973). The eggs are deposited in chains along the undersides of spines where they are heavily attacked in Pima County by parasitic Hymenoptera in the genera *Gryon* (Scelionidae) and *Neorileya* (Eurytomidae) (unpublished data).

*Leptoglossus brevirostris* Barber

*Phoradendron californicum* Nutt. (Loranthaceae), desert mistletoe: Pima Co., Santa Rita Exp. Rng., 880 m, 3-III-90 (growing on velvet mesquite *Prosopis velutina*
Woot. (Leguminosae), two adults; Pima Co., Tucson, 3-VIII-90, 720 m, (on mesquite) one female; Rillito, 16-II-91 (on mesquite), ten adults, some mating.

UV light: Pima Co., Tucson, 23-VI-90, 20-IX-90, 720 m, one female, each date.

Females held in the laboratory produced dark reddish brown eggs in a single contiguous row (chain) on the host stem. Schaefer and Mitchell (1983) reported *L. brevirostris* from *Phoradendron* sp. This is the second *Leptoglossus* sp. reported to breed on a mistletoe species (Blatchley 1926). Most of the type series of *L. brevirostris* were from specimens collected in the Huachuca Mountains.

*Leptoglossus clypealis* Heidemann

*Arctostaphylos pungens* H.B.K. (Ericaceae), Mexican manzanita: Pima Co., Santa Catalina Mtns., Molino Basin, 1250 m, 8-IV-89, several mating pairs on a single shrub; Santa Cruz Co., 11 km SE of Canelo, 12-V-91, one adult in oak-juniper woodland.

*Dasyliodon wheeleri* Wats. (Agavaceae), desert spoon: Santa Cruz Co., Duquesne (site), 18-VIII-91, two 5th instars, two adults on leaves in oak-juniper woodland.

*Juniperus deppeana* Steud. (Cupressaceae), alligator juniper: Greenlee Co., Blue River Wilderness, 1920 m, 5-VII-91, one 3rd instar, one adult along roadside in oak-juniper woodland.

*Juniperus monosperma* (Engelm.) Sarg. (Cupressaceae), one-seeded juniper: Pima Co., Santa Catalina Mtns., Molino Basin, 1450 m, 14-IV-90, several mating pairs on a single tree in oak-juniper woodland.

*Juniperus* sp. (Cupressaceae): Mohave Co., 40 km S of Wickiup, 25-V-90, one 3rd instar, two adults in rocky grassland.

Essig (1926) reported this insect abundant in yucca flowers in spring. Allen (1969) listed references to its status as a pest of small fruits, and Bolkan et al. (1984) showed it to be a pest of pistachio in California.

*Leptoglossus zonatus* (Dallas)

*Chilopsis linearis* (Cav.) Sweet (Bignoniaceae), desert willow: small breeding populations have been observed in plantings of this native tree in Tucson from June-September.

*L. zonatus* is best known as a nuisance on pomegranate *Punica granatum* L. (Punicaceae) (Torre-Bueno 1941, Burgess and Hawkins 1945) and can be found in large numbers on this exotic ornamental in local urban plantings. Cockerell (1905) and Essig (1926) mentioned other crop hosts. Native breeding hosts have not previously been reported. I have continuously reared this species on a semi-liquid artificial diet developed by Debolt and Patana (1985) to rear *Lygus hesperus* Knight (Miridae); adults readily deposit egg chains along vertically placed wooden applicator sticks. On pomegranate in Tucson, the egg chains are deposited along the smaller stems and leaf midribs and are heavily attacked by parasitic Hymenoptera in the genera *Gryon* (Scelionidae), *Neorileya* (Eurytomidae), *Ooencyrtus* (Encyrtidae), and *Anastatus* (Eupelmidae) (unpublished data).

*Mozena arizonensis* Ruckes

*Baccharis sarathroides* A. Gray (Compositae), desert broom: Pima Co., Santa Rita Mtns., lower Madera Cyn., 1250 m, 29-VIII-91, 34 egg chains, all uneclosed, eight females (two ovipositing) in grasslands dominated by mesquite and desert
broom. Eggs were heavily parasitized by Hymenoptera in the genera *Ooencyrtus* (Encyrtidae), *Gryon* (Scelionidae), and *Neorileya* (Eurytomidae). A return to the site on 20-VIII-91 yielded several more egg masses, mostly eclosed, two females but no nymphs.

Adults and green nymphs of this species are common from May to October on mesquite. This is the first report of *M. arizonensis* on a plant other than mesquite, although no nymphs were observed.

*Mozena bueno* Hussey

*Acacia angustissima* (Miller) Kuntze (Leguminosae), fern acacia: Santa Cruz Co., 5 km SE of Sonoita, 21-VII-91, two 5th instars (reared to adult), two adults in ungrazed roadside right-of-way in rolling grassland. Plants not common at site, inconspicuous among grasses; flowering, no fruit present.

Hossain (1970) and Schaefer and O'Shea (1979) reported an "*Acacia* sp." as a host of *M. bueno*. Living adults are predominantly red, in dramatic contrast to the green nymphs.

*Narnia femorata* Stål


*Mammallaria* spp. (Cactaceae): Pima Co., Arizona-Sonora Desert Museum, 16-V-90, 4th-5th instars damaging different species and varieties in a cactus nursery; Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 14-IV-91, 1st instars and adults on widely scattered plants.

Nymphs and adults of *N. femorata* are common on *Opuntia* spp., depositing their globular eggs in single chains along the ventral surface of cactus spines. Its biology has been studied by Hunter et al. (1912) and Mann (1969).

*Piezogaster indecorus* (Walker)

*Cirsium* sp. (Compositae), thistle: Pima Co., Santa Catalina Mtns., Oracle - Mt. Lemmon Rd., 8-VI-91, 1830 m, one male, two females together on a single fruit.

The reddish brown eggs were deposited in laboratory singly, loose, not glued to a substrate. Nothing has been published previously about the biology of *P. indecorus*, a Mexican species that reaches the United States only in southeastern Arizona.

*Piezogaster spurcus* (Stål)

*Cirsium* sp. (Compositae), thistle: Santa Cruz Co., Canelo, 20-VII-1991, seven adults, six 1st instars (reared to third instars, prob. *P. spurcus*), on three isolated preblooming plants in an open marsh.

The *Cirsium* sp. is distinctly different than that from which *P. indecorus* was collected. Nothing is known of the biology of this species. Neither O'Shea (1980) nor Froeschner (1988) listed *P. spurcus* from the United States, but Barber (1926) reported specimens from Arizona in the U. S. National Museum collection (as *Capaneus spurcus* Stål).
Thasus sp. 4

Prosopis velutina Woot. (Leguminosae), velvet mesquite: Pima Co., Santa Rita Mtns., Sawmill Cyn., 1300 m, 20-VIII-91, five 4th instars, several adults scattered among several trees in a small dry wash through desert grassland at base of mountains; Tucson, 25-VI-90, 725 m, one cohort of 5th instars; Santa Rita Mtns., Madera Cyn., 8-VI-90, 1175 m, three cohorts of 4th instars; 13-VII-90, six cohorts of 5th instars (two groups with 2-4 teneral adults each); same site, 22-VII to 15-VIII-89, several dozen adults in discrete clusters of 2-7 individuals concentrated on only 5-6 adjacent trees in an area of many ha. Dominated by mesquite; similar observations in 1990 and 1991 during the same period; 3-II-1991, 21 eggs in a single chain along the underside of a 3 cm-diam. stem; 297 eggs collected in 32 separate groups, nearly all on the inside surface of exfoliating bark at the bases of older trees (most of the eggs were eclosed, apparently deposited in years previous); same site, 7-II-91, 414 eggs (77 uneclosed) on inner surface of 45 pieces of bark from six large trees; same site, 29-VI-91, three cohorts of 10, 14 and 17 (3rd, 4th and 5th instars) on three trees; Pima County, Santa Catalina Mtns., Sabino Cyn., 11-VI-91, ca. 250 3rd, 4th and 5th instars in four loose groups on two adjacent trees; Tucson, 29-VIII-90, two egg masses, each deposited as a single chain on the underside of stems; Santa Cruz Co., Huachuca Mtns., Ash Cyn., 1555 m, 20-VIII-90, 13 adults in groups of 1-4 on pod clusters in a single isolated tree.

Nymphs are gregarious and feed primarily on pods, although leaf-feeding is common, especially among small nymphs emerged before pod formation. One cohort of normal sized fifth instars and teneral adults were clustered on an isolated tree bearing no pods.

All United States records of T. gigas (Klug), T. gigas (Burmeister), and T. acutangulus Stål, refer to a previously undescribed species, T. neomexicanus (ms. name)3. Torre-Bueno (1940b) and Ward et al. (1977) reported this species (as T. gigas (Klug)) on mesquite in Arizona, and Van Duzee (1923) reported T. gigas (probably T. neomexicanus) nymphs on mesquite in the Baja California peninsula, Mexico. Torre-Bueno (1945) and Torre-Bueno and Ambrose (1936), described certain behavioral traits (as T. gigas). The T. acutangulus of Aldrich and Blum (1978) is the related Pachylis laticornis (F.) (Schaefer and Mitchell 1983).

CYDNIDAE
Sehirinae
Sehirus cinctus cinctus (Palisot)

Marrubium vulgare L. (Labiateae), common horehound: Santa Cruz Co., Patagonia, 18-V-89, numerous adults; Pima Co., Santa Rita Mtns, Madera Cyn., 4-V-88, numerous adults in disturbed open site in mesquite-oak transition.

4In a forthcoming revision of Thasus, Brailovsky, Barrera, Packauskas, and Schaefer will describe several new species including T. neomexicanus (Carl W. Schaefer, personal communication).
PENTATOMIDAE
Asopinae

All species in this subfamily are considered to be predaceous. Thomas (1992) recently revised the Asopinae of the Western Hemisphere.

Apateticus marginiventris (Stål)

Cassia leptocarpa Benth. (Leguminosae), slim pod senna: Pima Co., Santa Rita Exp. Rng., Santa Rita Ranch, in shallow grassy wash, 3-IX-89, two 5th instars (reared to adults) on the same isolated plant.

Mixed semiaquatic plants: Santa Cruz Co., Canelo, 21-VII-91, one male in a marsh through an open oak woodland.

Perillus bioculatus (Fabricius)

Sphaeralcea sp. (Malvaceae): Santa Cruz Co., 5 km S of Sonoita, 21-VII-91, seven adults on three plants heavily infested with eggs and adults of Calligrapha serpentina (Rogers) (Coleoptera: Chrysomelidae) along an ungrazed roadside in desert grassland.

Mixed broadleaf annuals and grasses: Pima Co., Tubac, 9-IX-90, one male in open roadside.

Adults were observed to feed on their beetle host by piercing the membrane between the head and thorax.

Podius neglectus (Westwood)

Salix gooddingii Ball (Salicaceae), Goodding willow: Pima Co., 16 km NW of Tucson, Santa Cruz River, 14-XI-87, one 5th instar (reared to adult), one adult at riverbank.

Medicago sativa L. (Leguminosae), alfalfa: Cochise Co., Benson, 22-IV-88, one male.

The eastern species, P. fretus Olsen, was recently synonymized with P. neglectus (Thomas 1992). Although adults superficially resemble P. maculiventris (Say), the nymph collected above was marked with metallic blue-black and red; P. maculiventris nymphs are not brightly marked.

Discophilinae
Linostethus tenebricornis (Ruckes)

Agropyron subsecundum (Link) Hitchc. (Poaceae), bearded wheatgrass: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 26-VI-90, one adult in shady canyon.

Nolina microcarpa Wats. (Agavaceae), beargrass: Santa Rita Mtns., Madera Cyn., 1250 m, 3-VIII-90, four mating pairs on main stem of a single isolated plant on a shady slope.

Parthenocissus inserta (Kerner) K. Fritsch (Vitaceae), thicket creeper: Pima Co., Santa Catalina Mtns., Bear Cyn., 14-VI-90, one teneral adult (vine growing on hickory).

Extensive sampling of the above three plant species yielded no nymphs. Ruckes (1957) described this species from specimens collected in the Santa Rita and Huachuca Mountains, noting that they feed at the bases of Agave leaves. Donald B.
Thomas (personal communication) has taken large numbers of nymphs and adults on New Mexican locust, *Robinia neomexicana* Gray, near Portal in the Chiricahua Mountains, Cochise County. Known elsewhere only in Mexico.

**Pentatominae**

*Acrosternum hilare* (Say)

*Cowania mexicana* D. Don. (Rosaceae), quinine bush: Cochise Co., Huachuca Mtns., Ash Cyn., 20-VIII-90, several 2nd instars on chapparal surrounded by rolling desert grassland.


*Pyracantha* sp. (Rosaceae), firethorn: Cochise Co., Huachuca Mtns., Ash Cyn., 1555 m, 20-VIII-90, several 3rd instars on single escaped plant in oak woodland.


*Rubus arizonicus* Focke (Rosaceae), Arizona dewberry: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 1-VI-89, several adults along shady creek.


UV light: Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 30-VI-90, one male.

The green stink bug occurs over much of the United States and has been well studied as a pest of various crops. Russell (1952) and Butler and Werner (1960) recorded crop hosts of *A. hilare* in Arizona. Eastern populations deposit cream or pale green eggs; eggs from Arizona females were pale salmon pink.

**Banasa dimidiata** (Say)

*Arctostaphylos pungens* H.B.K. (Ericaceae), Mexican manzanita: Santa Cruz Co., Canelo, 12-V-91, two adults; Huachuca Mtns., Carr Cyn., 1900 m, 8-IV-89, nymphs, adults abundant; same site, 17-V-88, eggs, 2nd instars, adults abundant; 27-V-88, eggs, 3rd-5th instars, adults; Pima Co., Santa Catalina Mtns., Oracle - Mt. Lemmon Rd., 1950 m, 8-VI-91, ten adults; Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 14-IV-91, five adults in oak woodland.


Thomas (1981) recorded *B. dimidiata* from ash in Arizona. I have found it associated with *A. pungens* almost everywhere these plants are abundant and fruiting.

**Banasa rolstoni** Thomas and Yonke

*Fraxinus pennsylvanica* Marsh. ssp. *velutina* (Torr.) G. N. Miller (Oleaceae), velvet ash: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 14-VI-90, three adults; same site, 26-VI-90, 3rd-5th instars, several adults on samaras; Santa Cruz Co., Nogales, 14-IV-89, 3rd-5th instars; Santa Rita Mtns., Temporal Gulch, 14-IV-91, one mating pair in oak woodland.
Thomas (1981) reported this western species on *Fraxinus* spp. in Arizona and Nevada.

**Banasa subcarnea** Van Duzee

*Juniperus deppeana* Steud. (Cupressaceae), alligator juniper: Santa Cruz Co., Santa Rita Mts., Walker's Basin, 14-IV-91, one female on fruits in juniper-oak-manzanita association.


Thomas (1981) collected *B. subcarnea* from ash in Arizona. Van Duzee (1935) described this species partly from specimens from southern Arizona.

**Parabrochymena barberi barberi** (Ruckes)

*Quercus oblongifolia* Torr., Mexican blue oak: Pima Co., Santa Catalina Mtns., Molino Cyn., 1200 m, 7-III-90, one 5th instar (reared to male).

On ground: Cochise Co., Huachuca Mtns., Ramsey Cyn., 1700 m, one female in shady woodland.

This is the first host plant record for this subspecies, which is known only from Arizona.

**Brochymena dilata** Ruckes

*Pinus halepensis* Mill (Pinaceae), Aleppo pine (non-native): Pima Co., Oracle, 1500 m, 11-V-90, mating pair at base of tree.

Larivière (1992) reported collections of this uncommon species from other plants. Ruckes (1937) described *B. dilata* from specimens collected in Arizona. It is also known from New Mexico, Texas, Utah, and Chihuahua, Mexico.

**Brochymena hoppingi** Van Duzee

Overwintering: Pima Co., Santa Catalina Mtns., Summerhaven, 2320 m, 31-X-90, several dozen adults overwintering behind loose bark of two dead ponderosa pines, *Pinus ponderosa* Lawson var. *arizonica* (Engelm.) (Pinaceae); Summerhaven, 2320 m, 5-V-91, one mating pair on bark of dead *P. ponderosa*.

Ruckes (1937) reported collecting about 50 specimens in winter from a single *P. ponderosa* bole in New Mexico. Larivière (1992) reported specimens also collected from *Pinus cembroides* Dougl. and from pinyon-juniper woodlands.

**Brochymena parva** Ruckes

*Juniperus* sp. (Cupressaceae): Pima Co., Santa Catalina Mtns., Molino Cyn., 1150 m, 7-III-90, one male along steep open creek bank in oak-juniper woodland.

Overwintering: Pima Co., Santa Catalina Mtns., Pima Cyn., 20-II-91, several adults in honey bee swarm traps; Tucson, 21-II-91, several adults in honey bee swarm traps; Sabino Cyn., 10-III-91, one male under bark of dead *Quercus* sp.; Santa Cruz
Co., Organ Pipe Cactus Natl. Monu., 15-II-91, several adults in honey bee swarm traps.

Nymphs and adults are common everywhere on mesquite, feeding on the stems, leaf petioles and main veins. Egg masses, typically 14 per mass, are normally found deposited on leaves and leaf petioles but sometimes are deposited behind loose bark of tree trunks. It is often taken in light traps. Larivièrè (1992) summarized the recorded hosts. Eggs are attacked by *Trissolcus euschisti* (Ashmead) (Hymenoptera: Scelionidae) (unpublished data). The neotype is from Globe, Arizona (Froeschner 1988).

**Brochymena sulcata** Van Duzee

*Citrus maxima* (Burm.) Merrill x *C. sinensis* (L.) (Rutaceae), grapefruit: Pima Co., Tucson, 14-VI-91, seven adults on single tree in city.

*Nicotiana glauca* Graham (Solanaceae), tree tobacco: Pima Co., NW Tucson, 18-VII-88, one female along Santa Cruz River.

*Olea europaea* L. (Oleaceae), common olive: Pima Co., Tucson, 740 m, 10-VII-90, several adults together on main trunk of a small tree; same tree, 14-VI-91, two 3rd, one 4th instar, four adults; Tucson, University of Arizona campus, 25-VII-91, one female on a main stem.

*Prosopis velutina* Woot. (Leguminosae), velvet mesquite: Pima Co., Tucson, 22-V-90, several 5th instars, adults on a single tree limb.

*Salix gooddingii* Ball (Salicaceae), Goodding willow: Pima Co., Tucson, 18-VII-88, one male; 16 km NW of Tucson, 14-IX-87, two females; Tucson, 22-XI-87, three adults on one tree on riverbank; same site, 9-II-88, one female; Tucson, 650 m, 8-III-88, Tucson, one female; 29-III-89, one male; same site, 29-III-89, two adults on stems; same site, 8-V-89, female ovipositing on leaf; same site, 29-III-88, two egg masses, one female; same site, 8-V-89, one male.

*Tamarix pentandra* Pall. (Tamaricaceae), salt cedar: Yuma Co., Yuma, 8-III-90, one male, one female.

These insects feed primarily on the stems and leaf veins rather than on reproductive parts. Eger (1981) and Eger and Ables (1981) reported this species from *Salix* and other trees in Texas. Hopkins and Carruth (1954) also reported *B. sulcata* from *T. pentandra* in southern Arizona, a small exotic tree that grows in the same habitat as *Salix*. Ruckes (1938) and Larivièrè (1992) list collections from other tree hosts.

**Chlorochroa ligata** (Say)

*Arctostaphylos pungens* H.B.K. (Ericaceae), Mexican manzanita: Pima Co., Santa Catalina Mtns., Molino Basin, 1250 m, 17-V-90, many 2nd-3rd instars, one adult in oak-juniper woodland; Cochise Co., Carr Cyn., 1900 m, 27-V-90, 1st instars, adults.

*Cassia leptocarpa* Benth. (Leguminosae), slim pod senna: Pima Co., Santa Rita Exp. Rng., 1250 m, 3-IX-89, 3rd-4th instars in shrubless desert grassland.

*Ephedra aspera* Engelm. (Ephedraceae), boundary ephedra: Pima Co., Santa Rita Exp. Rng., 880 m, 12-IV-89, three adults. Other adult *C. ligata* were occasionally seen on these plants but were not specifically recorded.

*Lycium pallidum* Miers (Solanaeaceae), rabbit thorn: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 3-V-88, two adults.
Melilotus indicus (L.) All. (Leguminosae), alfalfa; Santa Cruz Co., Arivaca Cienega, 10-VII-91, 2nd-4th instars abundant, six adults in open marsh.

Prosopis velutina Woot. (Leguminosae), velvet mesquite; Pima Co., Santa Rita Mtns., Madera Cyn., 20-VIII-91, one 3rd, one 4th instars.

Rhus trilobata Nutt. (Anacardiaceae), squaw bush; Pima Co., 5 km E of Greaterville, 18-V-89, several 3-4th instars on fruits.

Known in the early literature as "the concluea," I found that C. ligata ranges into higher elevations than do other Arizona Chlorochroa spp. Morrill (1910) stated that mesquite is the principal preferred noncrop host in Texas and Mexico. In four years of sampling mesquite in southeastern Arizona, I found this insect only once. This and the following two species are well-known pests of a variety of western agricultural crops. Buxton et al. (1983) summarized the host plants and distribution of species in the genus Chlorochroa.

Chlorochroa sayi (Stål)

Atriplex canescens (Pursh) (Chenopodiaceae), wingscale, four-winged saltbush: Pima Co., Tucson, 16-II-91, one adult; Yuma Co., Yuma, 6-III-90, one male, one female.

Chenopodium sp. (Chenopodiaceae): Santa Cruz Co., Buenos Aires Natl. Wildlife Sanctuary, Mormon Lake, 10-VII-91, one adult near pond edge surrounded by desert grassland with scattered mesquite.

Melilotus indicus (L.) All. (Leguminosae), alfalfa; Santa Cruz Co., Arivaca Cienega, 10-VII-91, two adults in open marsh.

Rorippa islandica (Oeder) Borbas (Cruciferae), bog marsh cress; Santa Cruz Co., Buenos Aires Natl. Wildlife Sanctuary, Mormon Lake, 10-VII-91, adults abundant in dense plant populations around pond edge.

Both this and the next common species have previously been reported from "Atriplex" in Arizona (Torre-Bueno 1940a, Russell 1952). Other host plants for "the grain bug" or "Say's stink bug" in the Southwest, mainly crops and weeds, are listed by Morrill (1910), Caffrey and Barber (1919), Russell (1952), and Butler and Werner (1960). Some of these records undoubtedly refer to the following species, which closely resembles C. sayi and is more common in southern Arizona.

Chlorochroa uhleri (Stål)

Atriplex canescens (Pursh) (Chenopodiaceae), wingscale, four-winged saltbush: Pima Co., NW Tucson, 675 m, 7-II-91, one male; 15 adults between railroad right-of-way and highway; same site, 5-III-91, mating pair; same site, 12-III-91, one group of 2nd instars; same site; 19-III-90, cohort of 2nd instars; same site, 23-III-91, three adults; same site, 28-IX-88, 1st-3rd instars, several adults; Rillito, 675 m, 19-III-90, cohort of 2nd instars; same site, 22-IX-88, eggs, 5th instars, adults.

Atriplex polycarpa (Torr.) S. Wats. (Chenopodiaceae), all scale: Pima Co., NW Tucson, 680 m, 16-II-91, three adults between railroad right-of-way and highway dominated by A. canescens; same site, 23-III-91, one 2nd instar (reared to adult); same site, 22-IX-88, one egg mass (reared to adults), three 5th instars, one adult.

Cynodon dactylon (L.) Pers. (Poaceae), Bermuda grass; Pima Co., NW Tucson, along flood plain of Santa Cruz River, late February to mid-May, 1988-90, breeding population (plants dry, not flowering until July-August rains). Two egg masses collected from the site on 25-IV-89 were parasitized by Trissolcus utahensis (Ashmead) (Hymenoptera: Scelionidae).
ADDENDUM

In "New Host and Habitat Associations for Some Arizona Pentatomoidea and Coreidae", *Southwest Entomol.* Supplement No. 16, 1-29 (1993) by Walker A. Jones, a page was omitted. The succeeding page (154) should follow page 12 in the aforementioned publication.
Melilotus indicus (L.) All. (Leguminosae), alfalfilla: Santa Cruz Co., Arivaca Cienega, 10-VII-91, two adults in open marsh.

Poa annua L. (Poaceae), annual bluegrass: Pima Co., Marana, 2-IV-91, several 3rd instars, adults in disturbed opens field with scattered creosote bush.

Rorippa islandica (Oeder) Borbas (Cruciferae), bog marsh cress: Santa Cruz Co., Buenos Aires Natl. Wildlife Sanctuary, Mormon Lake, 10-VII-91, two adults.

Barber (1989) recently studied the seasonal history and host plants of this species (as C. sayi) in relation to its pest status on jojoba, Simmondsia chinensis (Link) Schneider (Simmondsiaceae), in southwestern Arizona. C. uhleri is much more common than its congeners in southeastern Arizona.

Chlorocoris flavivirdis Barber

Parthenocissus inserta (Kerner) K. Fritsch (Vitaceae), thicket creeper: Pima Co., Santa Rita Mtns., Bear Cyn., 1700 m, 13-VI-89, one teneral female; same site, 16-VI-89, one 5th instar (reared to female) in shady riparian canyon in ponderosa pine woodland.

Pteridium aquilinum (L.) Kuhn var. pubescens Underw. (Polypodiaceae), western bracken: Pima Co., Santa Catalina Mtns., Bear Canyon, 1700 m, 25-V-89, one male, one 5th instar (reared to male) in shady riparian canyon in ponderosa pine woodland (see C. subrugosus below).


No host plant records have previously been reported for this species, which is known only from the mountains of southeastern Arizona.

Chlorocoris hebatus Distant

Quercus emoryi Torr. (Fagaceae), Emory oak: Cochise Co., Huachuca Mtns., Carr Cyn., 1900 m, 17-V-88, two 4th instars; 27-V-88, three 5th instars, one teneral male on oak-juniper mountainside.

Quercus oblongifolia Torr., Mexican blue oak: Pima Co., Santa Catalina Mtns., Molino Cyn., 1500 m, 29-VIII-89, five males, one female on single tree, none from many adjacent trees on oak-juniper hillside; Santa Cruz Mtns., Florida Cyn., 1400 m, 19-IV-90, two 3rd instars in oak-juniper woodland.

UV light: Cochise Co., Chiracahua Mtns., Turkey Crk. Cyn., 22-VII-89; Pima Co., Santa Catalina Mtns., Oracle, 1500 m, one male; 23-VI-90, one female; 5-VII-90, one male; 20-VII-90, one male, one female; 18-IX-89, eleven adults; Santa Rita Mtns., Madera Cyn., 1550 m, 2-IX-89, one female; Santa Cruz Co., Santa Rita Mtns., Temporal Gulch, 17-VI-89, one male; same site, 30-VI-90, one male.

The flattened nymphs and adults are pale green which closely resemble a pastel green leaf with a pale mid-vein. Thomas (1985) also reported often taking this species from oaks.

Chlorocoris subrugosus Stål

Parthenocissus inserta (Kerner) K. Fritsch (Vitaceae), thicket creeper: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 25-V-89, eight 3rd instars in shady riparian canyon in ponderosa pine woodland.

Vitis arizonica Engelm. (Vitaceae), canyon grape: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 25-V-89, 24 third instars and one eclosed egg mass (may have been C. flaviviridis eggs) in shady riparian canyon in ponderosa pine woodland.

On 25-V-89 at the same site described above, several dozen 3rd instars were swept from other plants on or near which V. arizonica or P. inserta were growing: Muhlenbergia sp. (Poaceae), Rubus arizonensis (Rosaceae) and two unidentified immature perennials. At the same location on 16-VI-89, several more 3rd instars were swept from low vegetation and from P. virens; several 4th-5th instars were collected on 20-VI-89. All such vegetation had some V. arizonica growing on it or nearby. Thus, it is more likely that the two related vines are hosts to mobile nymphs of both C. subrugosus and C. flaviviridis.

Approximately 40 field-collected 3rd instar nymphs of C. subrugosus were reared in the laboratory to adults on green beans, Phaseolus vulgar L. One egg mass of 14 globular, shiny green eggs was deposited in three rows in the laboratory on 12-VI-89; these insects failed to survive to 3rd instar on green beans. Living adults are dark green, which often pales or yellows in pinned specimens. This is the first report of host plants of C. subrugosus, a species known only from Arizona and Mexico.

Cosmopepla decorata (Hahn)

Marrubium vulgare (L.) (Labiatae), common horehound: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 4-V-88, mating adults at edge of open disturbed area in woodland; same site, 9-V-88, mating adults abundant (none present at site in 1990 and 1991); Santa Cruz Co., Patagonia, 18-V-89, ten adults along shady riparian area.


Sisymbrium irio L. (Cruciferae), London rocket: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 4-V-88, many dozen mating pairs clustered among a few plants in shady disturbed area (had moved to adjacent M. vulgare by 4-V-90).

McDonald (1986) reported C. decorata common on M. vulgare and other Labiatae in Mexico.

Cytocephala antiquensis (Westwood)

Cynodon dactylon (L.) Pers. (Poaceae), Bermuda grass: Pima Co., NW Tucson, 18-IV-89, one male in flood plain of Santa Cruz River.

Melilotus indicus (L.) All. (Leguminosae), alfalfa: Santa Cruz Co., Arivaca Cienega, 10-VII-91, one female in open marsh.

This is the first ecological information reported for this insect.

Dendrocoris contaminatus Uhler

Larrea tridentata (DC) Coville (Zygophyllaceae), creosote bush: Mohave Co., Kingman, 26-V-90, three adults; Pima Co., Santa Rita Exp. Rng., 900 m, 3-III-90; same site, 29-IV-88, several 5th instars, adults; same area, 3-VI-88, 1st-2nd, 5th instars, 25 adults; same site, 12-IV-89, 5th instars, one adult; same area, 9-V-88, adults abundant; 6 km SE of Sahuarita, 880 m, 29-IV-88, one female; same site,
2-V-88, 3-5th instars abundant, six adults; same site, 9-V-88, 4th-5th instars, adults common; same site, 3-VI-88, all instars, adults abundant; Colossal Cave (site), 6-VI-89, two adults; Pinal Co., Florence Junction, 8-IV-88, one female.

Van Duzee (1923) and Hurd and Linsley (1975) previously reported *D. contaminatus* from creosote bush. Ruckes (1938) reported collecting *D. contaminatus* on *Quercus gambelii* Nutt., but the specimens are more likely those of another *Dendrocoris* sp. Osborn (1909) collected a specimen on *Opuntia* sp. during winter near Tucson, probably an overwintering site. The eggs of *D. contaminatus* are smooth, shiny green and tend to be irregularly four sided with the sides concave, in contrast to the circular cross section of most other pentatomids. Fifteen egg masses deposited in the laboratory ranged from 5-12 eggs per mass, usually deposited in two rows each, preferring fruits when present (unpublished data).

*Dendrocoris reticulatus* Barber

*Quercus emoryi* Torr. (Fagaceae), Emory oak: Cochise Co., Huachuca Mtns., Carr Cyn., 1900 m, 27-V-88, one female, one male in oak-juniper zone; Pima Co., Santa Catalina Mtns., Bear Cyn., 13-VI-89, one 3rd instar (reared to adult), one male in oak-juniper habitat zone; Molino Basin, 8-V-88, one egg mass, one female in oak-juniper zone; 14 *Telenomus giganteus* Johnson (Hymenoptera: Scelionidae) later emerged from the eggs.

*Quercus oblongifolia* Torr., Mexican blue oak: Pima Co., Santa Catalina Mtns., Molino Basin, 1500 m, 8-V-88, one female; same site, 29-VIII-89, one female in oak-juniper habitat. A tachnid (Diptera) larva emerged on 13-V-88 from the first collected female but the resulting puparium yielded no adult fly.

A single row of seven eggs was deposited on the underside of a *Q. emoryi* leaf in a greenhouse. The sides are slightly squared as in *D. contaminatus* but have a bristly appearance, and the aero-micropylar projections around the pseudoperculum are prominent, varying from 17-21 (n = 7). Barber (1911) described this species from specimens collected in the Huachuca Mountains in southeast Arizona.

This is the first reported host record for *T. giganteus* and the first record of parasitism in *D. reticulatus*.

*Euschistus biformis* Stål

*Bidens pilosa* L. (Compositae): Cochise Co., Huachuca Mtns., Miller Cyn., 1830 m, 20-VIII-90, two adults at edge of a weedy apple orchard in woodland; Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 22-VIII-89, one adult in small open area adjacent to shady creek at mesquite-oak transition; same site, 14-IX-89, several 4th-5th instars; same site, 20-IX-89, three adults.


*Melilotus indicus* (L.) All. (Leguminosae), alfalfa: Santa Cruz Co., Arivaca Cienega, 11-IX-91, one nymph (reared to adult), two adults in an open marsh.


*Verbascum thapsus* L. (Scrophulariaceae), common mullein: Pima Co., Santa Rita Mtns., Madera Cyn., 13-VIII-91, nine adults between leaves of a small isolated rosette (with *E. egglestoni*) adjacent to a riparian area.
Vitis arizonica Engelm. (Vitaceae), canyon grape: Pima Co., Santa Rita Mtns., 13-VIII-91, four adults feeding on ripe fruits in riparian area.

E. biformis occurs in the United States only in Arizona. I have readily reared it in the laboratory on green beans, Phaseolus vulgaris L., and shelled peanuts Arachis hypogaea L. Field-collected adults possessed rounded lateral pronotal angles, whereas progeny reared under a long photoperiod in the laboratory possessed acute pronotal angles, the character on which the name "biformis" probably is based. A similar phenomenon appears in E. tristignus (Say) and was demonstrated to be controlled by photoperiod (summarized by McPherson 1982).

Euschistus egglestoni Rolston


Eragrostis leymanniana Nees. (Poaceae), Leymann love grass: Pima Co., Santa Rita Mtns., Madera Cyn., 13-VIII-91, several adults, one teneral, in open area adjacent to shady creek at mesquite-oak transition.

Mellitotus indicus (L.) All. (Leguminosae), alfalfilla: Santa Cruz Co., Arivaca Cienega, 11-IX-91, three nymphs (reared to adults), two adults in open marsh.

Oenothera sp. (Onagraceae): Pima Co., Santa Cruz Mtns., Madera Cyn., 13-VIII-91, adults very abundant, feeding and mating on flower buds (with E. biformis) in partially shaded riparian canyon at mesquite-oak transition; same site, 20-VIII-91, same observations as previous entry.


Mixed vegetation: Santa Cruz Co., Arivaca Cienega, 11-IX-91, several nymphs (some reared to adult), several adults in open marsh.

Euschistus inflatus Van Duzee

Rubus arizonensis Focke (Rosaceae), Arizona dewberry: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 1-VI-89, several 3rd instars, adults along steep shady creek in ponderosa pine forest; 13-VI-89, same site, 3rd-5th instars abundant, three adults.

Pack and Knowlton (1930) reported this western species on sugar beet, willow, and peach in Utah, and Ruckes (1937) found it common on Verbasum thapsus L. in New Mexico. This is the first record of E. inflatus in Arizona. I have reared this species continuously for nearly three years on green beans and shelled peanuts.

Euschistus servus servus (Say)

Agropyron subsecundum (Link) Hitchc. (Poaceae), bearded wheatgrass: Pima Co., Santa Catalina Mtns., Bear Cyn., 1700 m, 13-VI-89, 2nd-3rd instars abundant; 16-VI-89, 4-5th instars, one male; 14-VI-90, 5th instars common.

Lactuca serriola L. (Compositae), wild lettuce: Santa Cruz Co., Arivaca Cienega, 10-VII-91, one 5th instar (reared to adult), one adult at edge of open marsh.

Mellitotus indicus (L.) All. (Leguminosae), alfalfilla: Santa Cruz Co., Aravaca Cienega, Arivaca, 10-VII-91, one 5th instar (reared to adult), two adults.
Rorippa islandica (Oeder) Borbas (Cruciferae), bog marsh cress: Santa Cruz Co., Buenos Aires Natl. Wildlife Sanctuary, Mormon Lake, 10-VII-91, one female at upper pond edge.

Unident. grass (Poaceae): Santa Cruz Co., Patagonia, 18-V-89, 4-5th instars, adults.

The brown stink bug is one of the commonest pentatomids in North America. Most of the older references to this species in the western states were reported under the name E. impictiventris Stål (Rolson 1974). Cassidy and Barber (1938), Russell (1952), and Butler and Werner (1960) have reported various biological aspects of E. s. servus as a crop pest in Arizona.

Holcostethus limbolarius (Stål)

Cirsium sp. (Compositae), thistle: Santa Cruz Co., Canelo, 21-VII-91, one 5th instar in open marsh.

Ambrosia deltoidea (Torr.) Payne (= Franseria deltoidea Torr.) (Compositae), burrobush: Pinal Co., Florence Junction, 8-IV-88, 2nd-5th instars at edge of dry wash.

Lycium sp. (Solanaceae), wolfberry: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 4-V-1988, one adult at mesquite-oak transition zone.

Medicago sativa (L.) (Leguminosae), alfalfa: Pima Co., Marana, 19-V-88, one adult. Adults, never nymphs, have often been collected from alfalfa but not recorded; they are more likely associated with a common agricultural weed Sisymbrium irio (below).

Melilotus indicus (L.) All. (Leguminosae), alfalfilla: Santa Cruz Co., Arivaca Cienega, 10-VII-91, one 5th instar (reared to adult), five adults in open marsh.

Rorippa islandica (Oeder) Borbas (Cruciferae), bog marsh cress: Santa Cruz Co., Arivaca Cienega, 10-VII-91, one 5th instar (reared to adult) in open marsh; same site, 1-VIII-92, numerous 5th instars and adults on maturing plants.

Sisymbrium irio L. (Cruciferae), London rocket: Pima Co., Marana, 24-II-88, one adult between cultivated fields; same area, 26-II-88, mating pair at edge of cotton field; same area, 29-II-88, two adults; same area, 1-III-88, four adults; same area, 8-III-88, one adult; Tucson, 650 m, 27-II-88, two adults along roadside; Tucson, 24-III-88, one 3rd instar in vacant lot; 8 km NW of Tucson, 26-II-88, one male, one female at cultivated field edge.

Sphaeralcea emoryi Torr. (Malvaceae), Emory globe mallow: Pinal Co., Florence Junction, 8-IV-88, one 5th instar (reared to adult) at roadside in lower desert.

Thomas and Werner (1981) reviewed references to grass associations for this species in the western ranges.

Hymenarcys crassa Uhler

Bouteloua sp. (Poaceae), gramma: Pima Co., 6 km N of Sonoita, 18-V-89, one female in shrubless rolling grassland.

Cassia leptocarpa Benth. (Leguminosae), slim pod senna: Pima Co., Santa Rita Exp. Rng., 1280 m, 3-IX-89, two 5th instars (reared to adult) on isolated plants in small wash in grassland.

Oetting and Yonke (1972) studied the biology of H. crassa using progeny of nymphs and adults collected in Texas from Asclepias sp. (Asclepiadaceae).
**Mecidea major** Sailer

*Avena fatua* L. (Poaceae), wild oat: Pima Co., Tucson, 650 m, 1-V-90, 3rd-4th instars, several adults, on isolated clumps scattered among Bermuda grass in river flood plain.

*Bromus* sp. (Poaceae), bromegrass: Pima Co., Tucson, 24-IV-90, nymphs and adults concentrated on scattered isolated plants among Bermuda grass in river flood plain.

*Cynodon dactylon* (L.) Pers. (Poaceae), Bermuda grass: Pima Co., Marana, 29-X-88, five adults, on roadside in creosote bush-mesquite desert; Tucson, 650 m, in broad river flood plain; same site, 28-II-90, two females; same site, 3-IV-90, one female; same site, 9-IV-90, 3rd-4th instars, adults; same site, 17-IV-89, several adults, same site, 24-IV-90, 3rd-4th instars, ten adults; same site, 27-IV-90, one 4th instar, several adults; same site, 1-IV-90, nymphs and adults present; same site, 24-X-89, six adults; same site, 27-X-89, three adults; Santa Catalina Mtns., Finger Rock Cyn., 1300 m, 16-IX-89, two adults in isolated clump among chapparal.

*Echinochloa crus-galli* (L.) (Beauv.) (Poaceae), barnyard grass: Pima Co., Tucson, 650 m, 1-V-90, 2nd-4th instars, several adults along roadside in city; same area, 5-X-88, one male.

*Eragrostis leymanniana* Nees. (Poaceae), Leymann love grass: Pima Co., Continental, 12-V-88, nymphs and adults in open areas between mesquite trees; Santa Rita Exp. Rng., 11 km SE of Sahuarita, 880 m, 12-88, 3rd-4th instars, adults, in desert grassland; same site, 7-II-91, one male; Santa Rita Mtns., Madera Cyn., 1180 m, 3-VI-88, 2nd-5th instars, adults in upper desert grassland; same area, 16-IV-90, several 4th-5th instars, two adults; same area, 15-88, large nymphs, adults; same area, 20-IX-89, one male, two females; 24 km W of Tucson, 4-III-90, one 4th instar, several adults along roadside.

*Muhlenbergia porteri* Scribn. (Poaceae), bush muhly: Pima Co., Santa Rita Exp. Rng., 890 m, 7-II-91, one male in habitat dominated by creosote bush, mesquites, cholla cactus and grasses; same site, 12-V-88, two 4th instars, five adults; same site, 20-XI-89, one adult in desert grassland with mesquites.

Unident. grasses (Poaceae): Pima Co., Tucson, 17-IV-89, several adults at roadside; 1-IV-89, four adults; Santa Catalina Mtns., Molino Basin, 1280 m, six adults on grassy slope among scattered oaks, junipers, and manzanita.

Females caged over potted *E. leymanniana* deposited cream-colored eggs in two rows of 12-14 eggs (n = 5) at the bases of stems near the soil level. Ruckes (1938), Sailer (1952), and Watts (1963) reported this species on *Bouteloua* spp. (Poaceae). Thomas and Werner (1981) listed other references to its association with grasses in the West.

**Mecidea minor** Ruckes

*Cynodon dactylon* (L.) Pers. (Poaceae), Bermuda grass: Pima Co., NW Tucson, 650 m, one male in river flood plain.

*Eragrostis leymanniana* Nees. (Poaceae), Leymann lovegrass: Santa Rita Mtns., lower Madera Cyn., 16-IV-90, five adults in desert grassland among mesquite trees.

Unident. grasses: Greenlee Co., Blue River Campground., 5-VII-91, one male in sandy river floodplain; Pima Co., Marana, 2-IV-91, two 5th instars, several adults (one teneral) adjacent to cultivated field; Santa Catalina Mtns., Molino Basin, 1220 m, 14-IV-90, six adults on grassy slope in open oak-juniper woodland.
**Eragrostis leymanniana** Nees. (Poaceae), Leymann love grass: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 20-VIII-91, adults very abundant in small open area adjacent to shady creek at mesquite-oak transition.

Mixed grasses (Poaceae), with *Bidens pilosa* L. (Compositae) and *Ipomoea* sp. (Convolvulaceae): Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 22-VIII-89, one male, one female at edge of disturbed open site at mesquite-oak transition; same site, 14-IX-89, two males, one female; Santa Cruz Co., Arivaca Cienega, 11-IX-1991, several adults near edge of open marsh.

Mixed grasses and broadleaf annuals: Pima Co., Tubac, 9-IX-90, one adult along highway right-of-way.

Mixed vegetation: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 13-VII-91, adults very abundant on a variety of vegetation including, in order of the bug's abundance, *Eragrostis leymanniana* Nees. (Poaceae), *Bouteloua curtipendula* (Michx.) Torr. (Poaceae), *Carex* sp. (Cyperaceae), *Oenothera* sp. (Onagraceae), *Verbascom thapsus* L. (Scrophulariaceae), and Arizona grape *Vitis arizonica* Engelm. (Vitaceae) in woodland opening adjacent to creek; same site, 20-VIII-91, similar observations as previous record; Santa Cruz Co., Canelo, 21-VII-91, one male swept from open marsh.

Ruckes (1938) collected this species from *Salix* sp. in New Mexico.

**Murgantia histrionica** (Hahn)

*Cleome* prob. *sonorae* Gray (Cleomaceae) (= Capparidaceae): Cochise Co., 6 km S of Willcox, 11-X-89, several adults on dead (flooded) plants along edge of an alkaline sink.


*Sisymbrium irio* L. (Cruciferae), London rocket: Pima Co., Marana, 1-III-88, one adult at edge of cotton field; 8-III-88, one adult; Tucson, 650 m, 24-III-88, one female; 29-III-88, two adults; Cochise Co., Benson, 12-V-88, 3rd-4th instars abundant; 27-V-88, one female.

The harlequin bug is usually confined to a variety of species within the related families Cleomaceae (= Capparidaceae) and Cruciferae, but may attack plants in other families during periods of high insect density (Chittenden 1908, Paddock 1918).

**Oebalus mexicanus** (Sailer)

*Eragrostis leymanniana* Nees. (Poaceae), Leymann love grass: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 13-VIII-91, several adults in small open area adjacent to shady creek in mesquite-oak transition; same site, 20-VIII-91, adults abundant.

Unident. grass (Poaceae): Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 14-IX-89, five adults in abandoned corral in mesquite-oak transition; same site, 20-IX-89, one female; 1350 m, 22-VIII-89, one male, one female at edge of disturbed open site at mesquite-oak transition; same site, 14-IX-89, two males, one female.

This species is known only from Mexico and southern Arizona (Sailer 1944).
Tepa brevis (Van Duzee)

*Atriplex canescens* (Pursh) Nutt. (Chenopodiaceae), wingscale, four-winged saltbush: Pima Co., Rillito, 16-II-91, one male in old river bed; Sahuarita, 2-V-88, one female at roadside; same area, 14-IX-89, one female.

*Atriplex polycarpa* (Torr.) Wats. (Chenopodiaceae), all scale: NW Tucson, 4-III-90, one male in creosote bush-*A. polycarpa* association.

*Medicago sativa* (L.), alfalfa: Cochise Co., Benson, 12-V-88, one female.

*Sisymbrium irio* L. (Cruciferae), London rocket: Pima Co., Avra Valley, 1-III-88, one female in irrigated alfalfa; Sahuarita, 14-IX-89, one adult along roadside in pecan orchard.

Tepa jugosa (Van Duzee)

*Atriplex canescens* (Pursh) Nutt. (Chenopodiaceae), wingscale, four-winged saltbush: Pima Co., Rillito, 12-III-91, one male at site mixed with *A. polycarpa*; same site, 24-III-88, one male; Tucson, 19-III-90, one female.

*Atriplex polycarpa* (Torr.) Wats. (Chenopodiaceae), all scale: Pima Co., Rillito, 16-II-91, one male, one female along railroad right-of-way; same site, 12-III-91 two adults; NW Tucson, 4-III-90, two adults along railroad right-of-way; same site, 5-III-91, one 5th instar, one female; same site, 19-III-90, one each 2nd and 5th instars (reared to adult), one female; same site, 23-III-91, one each 3rd and 4th instars; MEXICO, Sonora, 6 km W of Sonoyta (adjacent to Arizona border), 7-III-90, two adults in disturbed desert area dominated by *A. polycarpa*.

*Chenopodium* sp. (Chenopodiaceae): Santa Cruz Co., Arivaca Cienega, 11-IX-1991, five 5th instars (reared to adult), several adults in isolated plant populations in open marsh.

Bibby (1961) reported specimens from *Lycium* sp. (Solanaceae) and *Suaeda torreyana* Wats. (Chenopodiaceae) in Arizona. Van Duzee (1923) collected and described *T. jugosa* from *Atriplex barclayana* (Chenopodiaceae) in the Baja California peninsula of Mexico.

Tepa rugulosa (Say)

*Atriplex canescens* (Pursh) Nutt. (Chenopodiaceae), wingscale, four-winged saltbush: Pima Co., Sahuarita, 820 m, 2-V-88, one adult; Tucson, 16-II-91, two adults; Tucson, 12-III-91, one 3rd instar, two adults.

Bibby (1961) recorded this species in Arizona on *Atriplex* sp. and *Suaeda torreyana* Wats. (Chenopodiaceae). Ruckes (1937, 1938) collected *T. rugulosa* (as *Thyanta punctiventris* Van Duzee) on grasses and alfalfa in New Mexico.

Tepa vanduzeei Rider

*Atriplex polycarpa* (Torr.) Wats. (Chenopodiaceae), all scale: MEXICO, Sonora, 6 km W of Sonoyta (adjacent to Arizona border), 7-III-90, one adult (with *T. jugosa*) in disturbed desert area dominated by *A. polycarpa*.

Tepa yerma (Rolston)

*Atriplex canescens* (Pursh) Nutt. (Chenopodiaceae), wingscale, four-winged saltbush: Mohave Co., Kingman, 26-V-90, several 5th instars, three adults; Pima Co.,
Marana, 8-III-88, one male; 25-III-88, 1st-3rd instars, adults; 20-IV-88, 2-5th instars, several adults; NW Tucson, 7-II-91, three adults on same shrub, no others on many adjacent shrubs between railroad right-of-way and highway; same site, 7-II-91, three adults together on one shrub; same site, 16-II-91, one adult; same site, 26-II-90, two 5th instars, one mating pair; same site, 5-III-91, second instars, adults common; same site, 19-III-90, eggs, 1st-5th nymphs, mating adults; same site, 21-III-88, eggs, 2-5th instars, adults abundant; same site, 25-III-88, seven egg masses; same site, 29-III-89, three egg masses, all stages abundant; same site, 10-IV-90, 4th-5th instars, adults; same site, 24-IV-90, adults only; same site, 18-V-90, four adults (on one shrub) after extensive sampling; same site, 22-IX-88, 5th instars, adults; same site, 28-IX-88, two 5th instars, eight adults; 24 km W of Tucson, 4-III-90, several adults; Pima Mine Rd., 20-IV-88, 2nd-5th instars, adults on isolated plant along roadside; Santa Rita Exp. Rng., 29-IV-88, 3rd-5th instars, three adults; Sahuarita, 14-IX-89, one female along roadside.

_Atriplex polycarpa_ (Torr.) Wats. (Chenopodiaceae), all scale: Pima Co., Tucson, 570 m, 22-IX-88, three 4th instars (reared to adult).

_T. yerma_ is abundant in Pima Co. wherever fruiting _A. canescens_ occurs. Throughout late winter and spring, the insects breed on the mature seeds produced the previous year; adults during this period are the same mottled brown as the host seeds. During mid-May through July, after the old seeds have dropped, the insects are not present. When new seeds are produced during the July-August rains, the insects return to breed and are green like the newly produced host seeds. The pale eggs are deposited primarily on the winged seeds and are heavily parasitized by _Psix tunetanus_ Mineo and Szabó (Hymenoptera: Scelionidae) (unpublished data). References by Essig (1926) and Torre-Bueno (1940a) to the abundance of _T. rugulosa_ and _T. brevis_ specimens on _Atriplex_ undoubtedly include the much more common _T. yerma_, described 32 years later by Rolston (1972).

_Thyanta custator accerra_ McAtee

_Arctostaphylos pungens_ H.B.K. (Ericaceae), Mexican manzanita: Pima Co., Santa Catalina Mtns., Oracle - Mt. Lemmon Rd., 1890 m, 8-VI-91, three adults in oak-juniper woodland.

_Boerhaavia coccinea_ Mill. (Nyctaginaceae): Pima Co., Tucson, 30-X-90, one egg mass in city lot.

_Bouteloua_ sp. (Poaceae), gramma: Cochise Co., Texas Cyn., 16-X-89, three 5th instars.

_Cynodon dactylon_ (L.) Pers. (Poaceae), Bermuda grass: Pima Co., Tucson, 650 m, late February to mid-May, 1988-90, breeding population in flood plain of Santa Cruz River. This host plant does not turn green and begin fruiting until the arrival of seasonal rains in July-August, but _T. c. accerra_ is not present at that time.

_Enicella farinosa_ Gray (Compositae), brittlebush: Pima Co., Santa Catalina Mtns., Finger Rock Cyn., 1220 m, 7-V-88, three adults (one tender).

_Eriogonum_ prob. _fasciculatum_ Benth. (Polygonaceae), wild buckwheat: Pima Co., Santa Catalina Mtns., Finger Rock Cyn., 1300 m, 16-IX-89, two 5th instars (reared to adults) in isolated clump on rocky dry slope.

_Gaura_ sp. (Onagraceae): Pima Co., NW Tucson, 12-V-89, four egg masses on flower buds along river bank; Marana, 19-IX-89, one egg mass on fruit at edge of irrigated alfalfa field. _Psix tunetanus_ Mineo and Szabó (Hymenoptera: Scelionidae) emerged from the Marana eggs.

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Larrea tridentata (DC) Coville (Zygophyllaceae), creosote bush: Pima Co., Santa Rita Exp. Rng., 890 m, 7-II-91, one mating pair, one female in creosote bush-mesquite-cactus grassland zone; same area, 29-IV-88, 5th instars, adults abundant; same area, 2-V-88, 5th instars, adults abundant; same area, 9-V-88, 4th-5th instars, adults.


Melilotus indicus (L.) All. (Leguminosae), alfalfa: Santa Cruz Co., Arivaca Cienega, 10-VII-91, three 5th instars, four adults in open marsh.


Poa annua L. (Poaceae), annual blue grass: Pima Co., Marana, 2-IV-91, three 5th instars, many adults, in open disturbed ground among scattered creosote bushes (none in the creosote bushes).

Prosopis velutina Woot. (Leguminosae), velvet mesquite: Pima Co., Rillito, 28-VIII-90, several mating pairs on pods in a single tree along highway, none in adjacent trees. Extensive sampling has never yielded nymphs from mesquite.

Rorippa islandica (Oeder) Borbas (Cruciferae), bog marsh cress: Santa Cruz Co., Buenos Aires Natl. Wildlife Sanctuary, Mormon Lake, 10-VII-91, one 4th instar, three adults.

T. c. accerra has the widest host range and habitat breadth of any Arizona pentatomid, ranging from the desert floor to the fir-aspen belt, and it is the most commonly collected pentatomid in the state. I have collected adults from many tree species that are evidently resting hosts. Bibby (1961) reported this insect (as T. custator Fabricius) in Arizona from Bermuda grass (Poaceae) and Suaeda torreyana Wats. (Chenopodeaceae). Thomas and Werner (1981) reviewed records of this species (as T. pallidivirens spinosa Ruckes) associated with grasses in the western United States, and Russell (1952) reported on its life history in Arizona. Rider and Chapin (1992) recently revised the North American species of Thyanta.

Trichopepla semivittata (Say)

Daucus pusillus Michx. (Umbelliferae): Pima Co., Santa Catalina Mtns., Molino Basin, 1500 m, 8-V-88, eggs, 3rd-5th instars, adults, on open hillside; same site, 14-IV-90, one adult.

McDonald (1976) stated that T. semivittata ranges throughout southern Canada and the United States to northern Mexico; however, this is the first published record for Arizona.

Trichopepla n. sp.

Marrubium vulgare L. (Labiatae), common horehound: Pima Co., Santa Rita Mtns., Madera Cyn., 1650 m, 16-IV-90, seven adults in small open disturbed site in
mesquite-oak transition; same site, 13-VII-90, adults abundant, mating; same site, 17-VII-90, adults common; same site, 27-VII-90, 2nd, 3rd instars abundant, adults present; insects not present at site during 1989-92; Florida Cyn., 1-VIII-92, five adults swept from several small, scattered plant populations near base of mountains at beginning of oak-juniper zone; Santa Cruz Co., Arivaca, 1-VIII-92, dense population containing eggs, all stages of nymphs, and adults, some mating, on an isolated *M. vulgar* population between an open swamp and a stand of mesquite and cottonwood.

I have seen several nymphs and adults collected from a vegetable garden at Oracle, Pima Co., Santa Rita Mtns., which was also infested with *M. vulgar*; the specimens were not kept. This undescribed *Trichopecta* has adapted well to the exotic *M. vulgar*. Its native host is probably an uncommon species of Labiatae, which may explain why this pentatomid apparently has not previously been collected.

**SCUTELLERIDAE**

Scutellerinae

*Euptychodera corrugata* (Van Duzee)


This is the first host and habitat record for this small western species.

**Homaenus parvulus** (Germar)

*Cynodon dactylon* (L.) Pers. (Poaceae), Bermuda grass: Pima Co., Santa Catalina Mtns., Finger Rock Cyn., 1300 m, one adult, in small patch among rocks; Tucson, 17-IV-89, several adults, in flood plain of river; same site, 1-V-90, one adult; 5-X-88, one adult. Nymphs and adults were often observed at this river site during spring and early summer, 1988-90, but were not recorded.

*Eragrostis leymanniana* Nees. (Poaceae), Leymann lovegrass: Pima Co., Continental, 12-IV-89, one adult; Santa Rita Exp. Rng., 7-II-1991, one 5th instar (reared to adult); Santa Rita Mtns., Madera Cyn., 3-VI-88, two adults in grassy opening in oak woodland; Temporal Gulch, 14-IV-91, one adult, along sunny streambank in oak woodland; same site, 18-IV-90, one adult.


*Poa annua* L. (Poaceae), annual bluegrass: Pima Co., Marana, 2-IV-91, two adults among scattered creosote bush in lower desert.

Unidentified grasses: Cochise Co., Texas Cyn., 16-X-89, nymphs and adults, in chapparal; Pima Co., Santa Catalina Mtns., Molino Basin, 9-IV-89, one adult on rocky open hillside in oak-juniper zone; 14-IV-90, one adult; same site, 18-IV-90, two adults; 11 km N of Sonoita, 18-V-89, two adults in open grassland.

Unidentified sedge (Cyperaceae): Santa Cruz Co., Arivaca Cienega, 10-VII-91, one 5th instar, two adults in open marsh; Canelo, 20-VII-91, two 5th instars, two adults in open marsh.

In the greenhouse, females deposited cream-colored eggs in two vertical rows on lower plant parts. Laboratory-produced eggs, placed for a few days in a *C. dactylon* population containing breeding *H. parvulus*, yielded *Trissolcus erugatus* Johnson (Hymenoptera: Scelionidae) (unpublished data). This small, widely distributed pentatomid is generally known as a grass feeder, but the specific host plant species are poorly known (Lattin 1964, McPherson and Mohlenbrock 1976).
Sphyrocoris punctellus (Stål)

Bidens pilosa L. (Compositae) and Ipomoea sp. (Convolvulaceae), mixed: Pima Co., Santa Rita Mtns., Madera Cyn., 1350 m, 14-IX-89, ten adults in open disturbed area in oak-juniper and mesquite transition; same site, 20-IX-89, one adult; same site, 29-VI-91, one pair.

Gossypium thurberi Todaro (Malvaceae), desert cotton: Pima Co., Santa Rita Mtns., Sawmill Cyn., 1300 m, one 5th instar on isolated plant with mature fruit; Florida Cyn., 1-VIII-92, several adults on green fruits; Santa Catalina Mtns., Molino Basin, 2-III-92, three adults overwintering inside old fruits still on plants; 31-VII-92, same site, many adults and 5th instars feeding on green fruits.

Sphaeralcea sp. (Malvaceae), alkali pink: Pima Co., Santa Rita Mtns., Madera Cyn., 13-VIII-91, one 4th instar, one male, two females in open disturbed area in mesquite-oak transition.

This species ranges from Mexico and Texas to southeastern Arizona. Desert cotton is clearly its major native host plant in Arizona. It is also found in cultivated cotton. Lattin (1964) reported sweetpotato, Ipomoea batatas (L.), as a host; the Ipomoea association recorded above may be the source of those collections.

THYREOCORIDAE

Thyreocorinae

Corimelaena lateralis

Ranunculus macranthus Scheele (Ranunculaceae), large buttercup: Santa Cruz Co., Aravaca Cienega, 10-VI-91, large nymphs and adults abundant on flowers in open marsh; Canelo, 21-VII-91, adults abundant on flowers in open marsh.

McPherson (1982) summarized reports of the host plants of this species, which is closely associated with certain Umbelliferae. This is the first record of this common eastern species in Arizona.

Corimelaena nigra (Dallas)

Mixed vegetation: Pima Co., Santa Rita Mtns., Madera Cyn., 22-VIII-89, one 5th instar, several adults swept from mix of grasses, Bidens pilosa (L.) (Compositae), and Ipomoea sp. (Convolvulaceae) at edge of shady opening in mesquite-oak transition.

Corimelaena incognita (McAtee & Malloch)

Nicotiana glauca Graham (Solanaceae), tree tobacco: Pima Co., Tucson, Santa Cruz River, 650 m, 15 to 20-VII-88, semitransparent, colorless eggs deposited singly inside green bracts; all stages found inside mature seed capsules of this exotic host. Eggs were parasitized by an undescribed Telenomus sp. (Hymenoptera: Scelionidae). No C. incognita were present at site on 19-IX-88 and none during 1989-90. On 18-VII-88, 236 eggs were counted from a random sample of 64 mature and nearly mature seed capsules of N. glauca; 62 (26.3%) were either parasitized or parasitoids had already emerged. Fifty nymphs (all stages) and 36 adults were found inside the seed capsules, usually with more than one per capsule. Since seed capsules contained eggs and sometimes large accumulations of nymphal exuviae, the insects evidently can develop to adult within individual capsules that contain hundreds of tiny seeds.
The openings of some of the mature seed capsules were clearly too narrow for adults to escape.

*Nicotiana trigonophylla* Dunal (Solanaceae), wild tobacco: Pima Co., Continental Ranch, 4-III-90, several adults; Tucson, 4-IV-88, adults common on roadside plants; 27-IV-90, eggs, small nymphs, adults abundant.

Bibby (1961) recorded *C. incognita* from *Nicotiana* sp. at Tucson and Buckeye. Torre-Bueno (1939) stated that the similar *C. extensa* Uhler was found "on wild tobacco (*Nicotiana* sp.)" in Arizona, and Lung and Goeden (1982) studied the biology of *C. extensa* on *N. glauca* in California. There may be some confusion about the identity of the species common around Tucson on *Nicotiana* spp.; I have not seen *C. extensa* on *Nicotiana* spp.

**SUMMARY AND DISCUSSION**

Host plants, distribution and associated habitats are recorded for 62 Arizona Heteroptera: one acanthosomatid, 12 coreids, one cydnid, 42 pentatomids, three scutellerids, and two thysanocerids. At least 90 new breeding hosts are documented. Ecological information is recorded for the first time for most species.

Females of the newly described acanthosomatid, *Elasmucha cordillera*, were found to guard their eggs as do other *Elasmucha* species across the Holarctic (Frost and Haber 1944, Kudo et al. 1989). Others in the genus also breed on various Betulaceae.

The coreid, *Thasus neomexicanus* (ms. name), probably the largest terrestrial heteropteran in the United States, was found to be univoltine and is the only North American coreid reported to overwinter in the egg stage. It is further unique in displaying two distinct types of oviposition behavior, depositing eggs in single rows on mesquite branches and in irregular rows and groups on the undersides of loose bark at the bases of trees. The large aggregations of brightly colored nymphs are familiar to many local homeowners because of their habit of migrating to the base of their host trees, apparently in response to high afternoon temperatures (unpublished data).

The host range of some other large coreids is somewhat unusual because they are apparently restricted to a few taxonomically unrelated plants. The large *Acanthocephala thomasi* clearly breeds on species of Agavaceae (*Agave* and *Yucca* spp.), but also on *Fraxinus pennsylvanica* (Oleaceae) and *Baccharis sarathroides* (Compositae). *Leptoglossus cyanealis* and *L. zonatus* nymphs were collected only on two unrelated hosts each. More intensive collecting may establish a wider variety of hosts like that exhibited by certain other eastern *Leptoglossus* spp. (Schaefer and Mitchell 1983). *Mozena arizonensis* commonly breeds on mesquite but was found to deposit eggs in large numbers on nearby *Baccharis sarathroides* shrubs, but no nymphs were subsequently found. Coreids are known to glue their eggs singly, in a single chain, and in loose groups, but none have previously been reported to deposit them unglued as does *Piezogaster indecorus*. Species in the pentatomid genus *Tepa* are clearly associated with certain Chenopodiaceae in desert areas.

Although little or nothing is known of the habits of most of the pentatomids endemic to Arizona and the Southwest, some are occasionally abundant. The little *Tepa yerma*, not described until 1972 (as *Thyanta yerma* Rolston) (Rolston 1972), is abundant wherever its host, *Atriplex canescens*, occurs. Since this plant is a prime range food for cattle, sizable *T. yerma* populations are usually confined to ungrazed host populations growing along highway rights-of-way. *T. yerma*’s adaptation to *A. canescens* is illustrated by its seasonal color change, which corresponds to the color
change in its host. The vast areas occupied by creosote bush provide Dendrocoris contaminatus with an abundance of food, particularly where the plants receive summer rains that allow it a second annual fruiting. Other species, such as Cosmopepla decorata, certain Chlorocoris spp., and some Euschistus spp., were abundant in only one out of the four years sampled, being completely absent at the same sites in the other years. The discovery of a new Trichopepla sp. shows that other undescribed species may await discovery.

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LITERATURE CITED


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