

## A taxonomic study of the genus *Atheas* Champion (Heteroptera: Tingidae)

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**ABSTRACT.** The genus *Atheas* Champion is revised. A key to all 14 species cataloged in the genus is included. Species occurring in Mexico are redefined and illustrated. Descriptions of species not occurring in Mexico are also provided. Host plant information has been included, when available.

**Key Words:** Heteroptera, Tingidae, *Atheas*, revision, Mexico, key.

### Introduction

The present work was based on the author's master's thesis that was mainly intended to broaden the knowledge of the Mexican species of Tingidae (Miller, 1992). This study deals with the genus *Atheas*, with an emphasis on the species occurring in Mexico, which are redefined and illustrated. Diagnostic descriptions, but not illustrations, for species not occurring in Mexico have been included to make the study more inclusive, as well as a much needed key for all 14 species known. Previous taxonomic work done by Champion (1898), Heidemann (1909), Blatchley (1926), Froeschner (1944), and Slater and Baranowsky (1978) have included some keys, but these treated only a few species.

The genus *Atheas* was described by Champion (1898), the type species of which is *A. nigricornis* Champion (designated by Van Duzee, 1916). In the same paper Champion described two other new species: *A. flavipes* and *A. fuscipes*. He also included a key and illustrations for the three new species. In 1909, Heidemann contributed four new species: *Atheas insignis*, *A. austroriparius*, *A. exiguus* and *A. mimeticus*. His work includes illustrations and a key to the four new species. Osborn and Drake (1917) described *A. annulatus* and *A. sordidus*, which later proved to be synonyms of *A. mimeticus*. The presence of brachypterous and macropterous specimens in these species led to confusion. *Atheas tristis*, was described by Van Duzee (1923). Drake and Hambleton (1935) described *A. ornatipes* from Brazil. The remaining species of the genus were described between 1938 and 1947. Drake described *A. mirabilis* in 1938 and *A. paganus* in 1942. Drake and Poor (1940) described *A. placentis*, and *A. laetantis* was described by Drake and Hambleton

(1944). The last species to be described, *A. cearanus*, was by Monte in 1947.

The genus *Atheas* has been included in the catalogs of Banks (1910), Van Duzee (1917), Monte (1941), Drake and Ruhoff (1960, 1965), and most recently Henry and Froeschner (1988).

Recent taxonomic work not included in the catalogs has been done by Slater and Baranowsky (1978), and it includes diagnostic descriptions of two species occurring in the United States. Additionally, Brailovsky and Torres (1986), in a revision of the Mexican genera, redefined and illustrated *Atheas*.

Distributional and host plant studies have been done by Barber (1914), Osborn and Drake (1915), Van Duzee (1916), McAtee (1923), Drake (1925), Drake and Hambleton (1934), De Costa Lima (1936), Drake and Hambleton (1938), Monte (1939), Hurd (1946), and Beshear, et al. (1976).

The genus *Atheas* is endemic to the New World. Species occur from north central and northeastern United States south to Mexico, Central America and South America. Of the 14 species recorded for the genus, six are of Nearctic origin, and the rest are from the Neotropical Region.

Most species of *Atheas* are of little or no economic significance. *Atheas cearanus* is probably the most important one because it feeds on several species of *Manihot* or cassava. The tuberous roots are used to obtain the starch from which tapioca is made. Also some species of *Manihot* are used to obtain rubber (Bailey, 1949). Other species of *Atheas* feed on ornamentals or wild plants.

The present study was based on specimens deposited in the insect collections of the U.S. National Museum of Natural History, Washington D.C. (USNM); Instituto de Biología, National Uni-

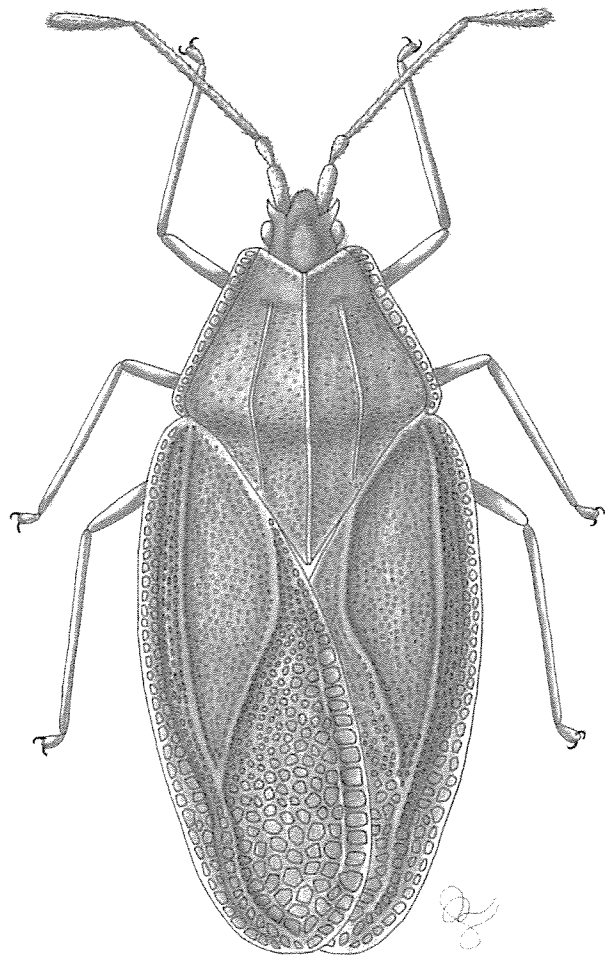


Figure 1. Genus *Atheas* Champion, dorsal view.

versity of Mexico, Mexico City (UNAM); Texas A&M University, College of Agriculture, Texas (TAMU); and the Museu Nacional, Rio de Janeiro, Brazil (MNRJ). Since this work emphasizes the species occurring in Mexico, hundreds of specimens from Mexico were examined. Only a relatively small number of specimens from other countries, particularly of those species not occurring in Mexico, was examined. Holotypes and paratypes examined were from the USNM, with the exception of the paratypes of *A. cearanus* which were on loan from the MNRJ.

When Champion (1898) wrote a key for the first three described species of *Atheas*, he separated them according to shape and thickness of the antenniferous tubercles. However, measurements were not included in his comparisons. Because of its importance, the same characteristic was used in the present study. The length of the antenniferous

tubercles was measured and compared to the width of the first antennal segment. This characteristic was used to separate the species into two main groups: those with "long" antenniferous tubercles and those with "short" antenniferous tubercles.

Further studies on several other structures provided other useful characters. Comparisons among the widths of the costal, subcostal and discoidal areas, and comparisons of the antennal segment lengths, as well as their coloration, were the main characteristics employed in separating the species. Variations of rostral length could also prove to be useful in separating species. However, due to the reduced number of specimens examined of some species, particularly from South America, this character was not used in the key.

### Genus *Atheas* Champion

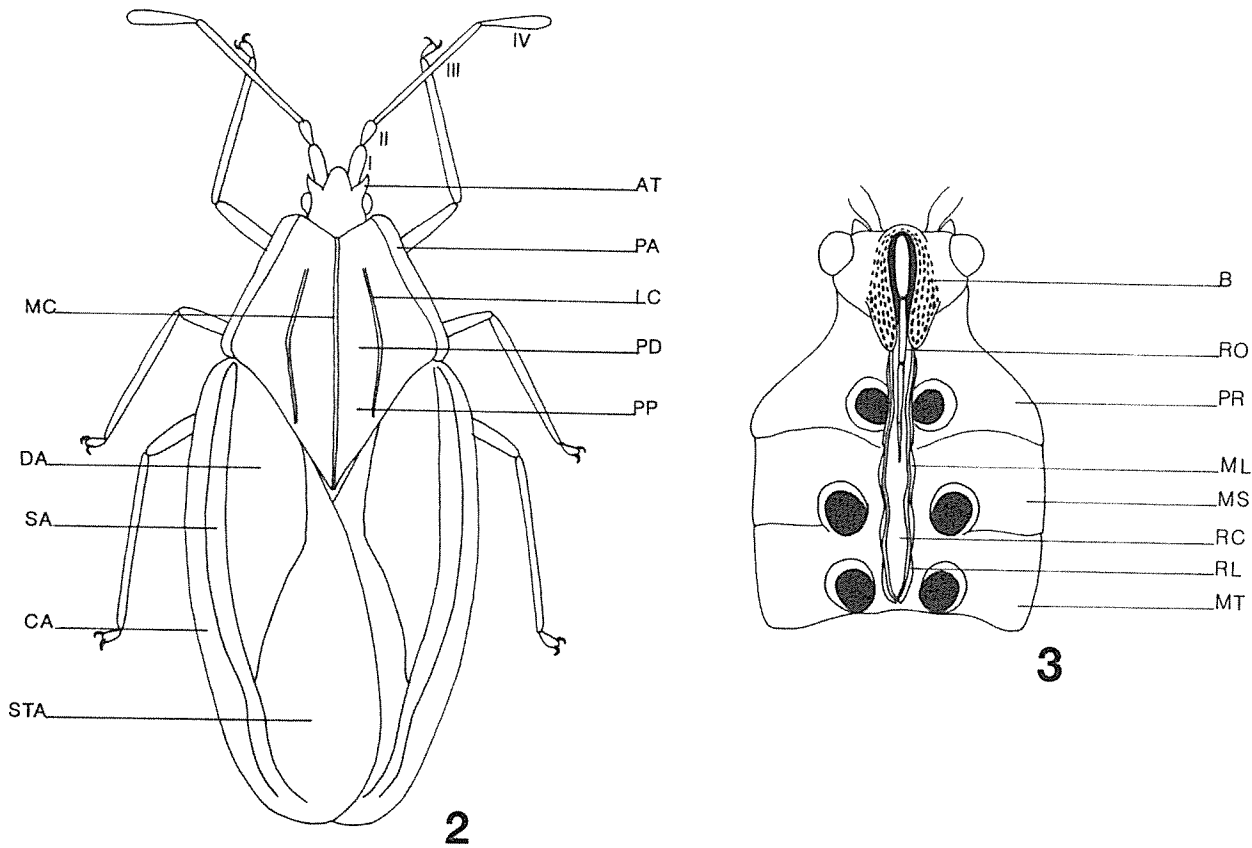
*Atheas* Champion, 1898: 44.

**Type species.** *Atheas nigricornis* Champion, 1898. Designated by Van Duzee, 1916: 26

**Diagnosis.** The members of the genus *Atheas* are characterized by their laterally spiniform antenniferous tubercles, lack of spines on the head, a tricarinate pronotum, very narrow but conspicuous paracosta which are mostly uniseriate, lack of a pronotal hood, bucula that is closed anteriorly, and fairly short rostrum that never extends beyond the mesocoxae (Figs. 1, 2 and 3). Other important morphological features include elytra that are generally elongate-ovate or oblong in shape. Costal and subcostal areas are generally narrower than the discoidal area which is elongate, about one-half to two-thirds of the total length of the elytra. The sutural area of each elytron is wide and rounded at the apex. The rostral channel is closed behind. Rostral laminae are carinate to foliaceous, and they are parallel or converging at the middle (Fig. 3). Legs are somewhat elongate and slender, yellowish to dark.

### Key to species of *Atheas*

1. Length of outer margin of antenniferous tubercle approximately twice the width of antennal segment I..... 2
- Length of outer margin of antenniferous tubercle approximately equal to the width of antennal segment I ..... 4



Figures 2-3. Genus *Atheas* Champion, general morphological characteristics. Figure 2, dorsal view. Figure 3, head and thorax, ventral view. Legend: I, II, III, IV, antennal segments; AT, antenniferous tubercle; B, buccula; CA, costal area; DA, discoidal area; LC, lateral carina; MC, medium carina; ML, mesosternal laminae; MS, mesosternum; MT, metasternum; PA, paranota; PD, pronotal disc; PP, posterior process; PR, prosternum; RC, rostral channel; RL, rostral laminae; RO, rostrum; SA, subcostal area; STA, sutural area.

- |   |  |
|---|--|
| <p>2 (1). Costal area, at widest point just beyond apex of discoidal area, approximately as wide as discoidal area (Brazil) ..... <i>placentis</i> Drake and Poor</p> <p>— Costal area, at widest point just beyond apex of discoidal area, approximately twice as wide as discoidal area ..... 3</p> <p>3 (2). Antennal segment I almost three times as long as segment II; antennal segment III about three times as long as segment IV (Brazil) .. <i>laetantis</i> Drake and Hambleton</p> <p>— Antennal segment I, twice the length of segment II; antennal segment III twice the length of segment IV (Panama, Brazil) ..... <i>flavipes</i> Champion</p> <p>4 (1). Antennal segment III bicolored, brown or black basally, much lighter beyond ..... 5</p> <p>— Antennae wholly brown to black ..... 8</p> | <p>5 (4). Antennal segment III one third black (Fig. 4A) (US) ..... <i>mimeticus</i> Heidemann</p> <p>— Only basal one-fourth, or less, of antennal segment III dark (sometimes very weakly) (Fig. 4B) ..... 6</p> <p>6 (5). Subcostal area with three to four rows of areolae (US, Mexico) ..... <i>austroriparius</i> Heidemann</p> <p>— Subcostal area with the areolae biseriate ..... 7</p> <p>7 (6). Discoidal area approximately twice as wide as costal area (US) ..... <i>insignis</i> Heidemann</p> <p>— Discoidal area approximately three and one-half times as wide as costal area (US) ..... <i>exiguus</i> Heidemann</p> <p>8 (4). Mesosternal laminae converging at middle; legs yellowish-brown with tarsi dark ..... 9</p> |
|---|--|

- Mesosternal laminae parallel or subparallel; legs brown to black ..... 11
- 9 (8). Discoidal area approximately three times as wide as costal area; the areolae of the latter uniseriate to briefly biseriate (Mexico) .....  
..... *tristis* Van Duzee
- Discoidal area at least twice as wide as costal area, but never three times as wide ..... 10
- 10 (9). Inner anterior margin of paranota with an elongate cell (Ecuador, Honduras, Guatemala, Mexico, US) ..... *nigricornis* Champion
- Inner anterior margin of paranota with a single row of small cells (Mexico) .....  
..... *mirabilis* Drake
- 11 (8). Costal area nearly twice as wide as subcostal area ..... 12
- Costal and subcostal areas nearly equal in width ..... 13
- 12 (11). Discoidal area approximately as wide as costal area; discoidal area short, extending about one half of total length of the elytron (Brazil) .....  
..... *cearanus* Monte
- Discoidal area approximately one and one-half to two times as wide as costal area; length of discoidal area approximately two-thirds of entire length of elytron (Mexico, Guatemala, El Salvador, Brazil, Bolivia, Paraguay) .....  
..... *fuscipes* Champion
- 13 (11). Elytra dark, concolorous with pronotum (Brazil) ..... *paganus* Drake
- Elytra yellowish, strongly contrasting with blackish pronotum (Brazil) .....  
..... *ornatipes* Drake and Hambleton

### Species occurring in Mexico

#### *Atheas austroriparius* Heidemann

(Fig. 5)

*Atheas austroriparius* Heidemann, 1909: 235

**Description.** Length 2.6 mm; width 1.0 mm. Head black; antenniferous tubercles black, approximately as long as the width of the first antennal segment, robust and pointed, diverging at apex; antennae bicolored, somewhat stout, shorter than distance from apex of the head to the tip of posterior process; antennal segment I black, twice as long as II, stout and somewhat constricted about apical third; antennal segment II stout and black; antennal segment III almost twice as long as IV, somewhat stout, yellowish, except for a brown or dark

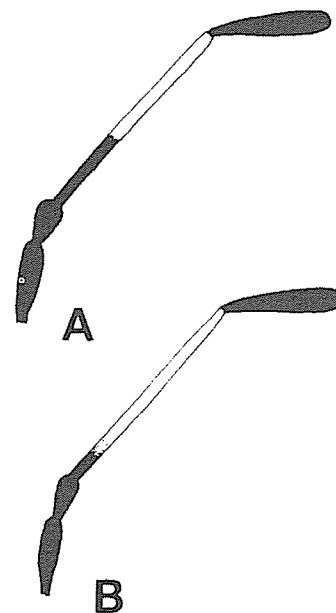


Figure 4. Antennal coloration of, A, *Atheas mimeticus*; B, *Atheas austroriparius*, *A. exiguus*, and *A. insignis*.

band (sometimes inconspicuous) covering about basal one-fourth; antennal segment IV blackish, about as long as I. Pronotum slightly convex, pitted; disc dark, tricarinate; carinae conspicuous, pale; posterior process dark, the tip yellowish and rounded; paranota pale or yellowish, margins somewhat sinuate, anteriorly with two rows of cells, the inner row with very small cells, a single row at humeri; collar dark, concave, and areolate. Elytra with costal area pale, areolae basally uniseriate (some specimens have a brief extra row of minute cells on the outer side) and distinctly biseriate at apex, the areolae subquadrate to rounded; subcostal area triseriate, wider than costal area, areolae rounded, brown to dark; discoidal area narrow, approximately twice as wide as costal area, extending approximately two-thirds of the total length of the elytron, brown to dark; sutural area small, somewhat narrow, hyaline with the nervures dark. Ventral area with buccula black except for pale margins; rostrum scarcely reaching the procoxae; rostral laminae conspicuous; mesosternal laminae parallel. Legs yellowish to light-brown, with the tarsi dark.

**Geographic distribution.** Mexico, U.S. (FL, GA, MO, MS, SC, TX).

**Host plants.** *Desmodium* sp., *Schrankia* sp.

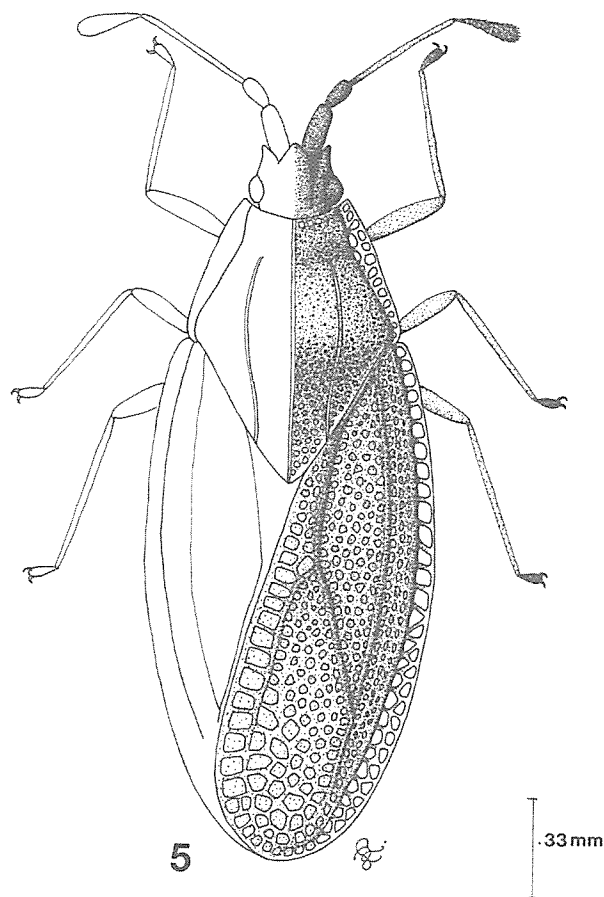


Figure 5. *Atheas austroriparius*, dorsal view.

**Comments.** There is a brachypterous form that differs from the macropterous form in the following ways: the pronotum is very flat; the costal area is narrower, approximately half the width of the subcostal area, with the areolae very small and inconspicuous at the biseriate portion; the sutural area is reduced and scarcely exceeds the tip of the abdomen.

*Atheas austroriparius* can be separated from *A. mimeticus*, *A. exiguus* and *A. insignis* by the triseriate subcostal area, which is biseriate in the other three species. The holotype from Columbus, Texas was examined (USNM).

***Atheas fuscipes* Champion**  
(Fig. 6)

*Atheas fuscipes* Champion, 1898: 45

**Description.** Length 2.5 mm; width 0.9 mm. Head black; antenniferous tubercles black, approximate-

ly as long as the width of first antennal segment, stout and pointed, slightly diverging anterolaterally; antennae black, shorter than distance from apex of head to tip of posterior process, moderately slender; antennal segment I almost as long as II; antennal segment III about two times as long as IV. Pronotum moderately convex, coarsely pitted; disc black, tricarinate; carinae somewhat low, pale to blackish; posterior process subacute, light brown to dark with tip lighter or yellowish, sometimes concolorous; paranota with the areolae anteriorly biseriate (sometimes with an inconspicuous elongate inner cell instead of inner row of cells) to uniseriate at humeri; collar somewhat concave, blackish with margins pale. Elytra with costal area generally biseriate, occasionally triseriate at widest portion, hyaline with nervures pale and infuscate at apex; subcostal area biseriate, dark or brown, about one-half as wide as costal area; discoidal area one-third wider than costal area, extending approximately one-half total length of elytron, dark or brown; sutural area hyaline, the nervures dark. Ventral area with buccula blackish except pale margins; rostrum reaching procoxae; rostral laminae low, rather separated; mesosternal laminae parallel or

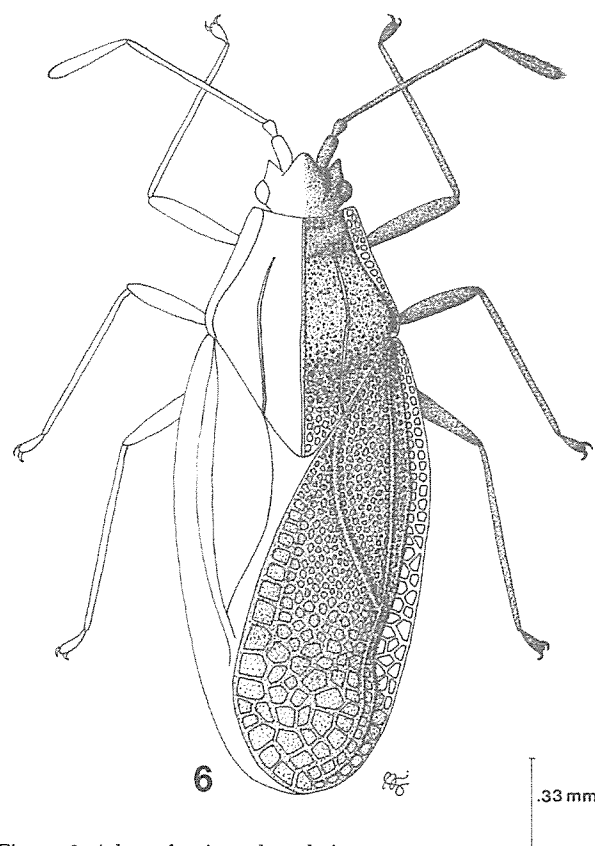


Figure 6. *Atheas fuscipes*, dorsal view.

subparallel. Legs black or dark brown, portions of tibia lighter in some, tarsi black.

**Geographic distribution.** Mexico (Chis., Gro., Mich., Mor., Nay., Oax., Pue., Tab., Ver), Guatemala, El Salvador, Brazil, Bolivia, Paraguay.

**Host plants.** *Eupatorium adenophorum*, Fabaceae.

**Comments.** *Atheas fuscipes* resembles *A. nigricornis* and *A. mirabilis*, but is readily separated from them by the blackish or brown color of the legs. The legs are yellowish or light brown in the other two species. The mesosternal laminae of *A. fuscipes* are parallel or subparallel and widely separated, but are converging at the middle in the other two species. A paratype from Rio Naranjo, Guatemala was examined (USNM).

***Atheas mirabilis* Drake**

(Fig. 7)

*Atheas mirabilis* Drake, 1938: 70

**Description.** Length 2.78 mm; width 1.2 mm. Head black, rugulose; antenniferous tubercles black, approximately as long as width of first antennal segment, stout and pointed, slightly directed anterolaterally; antennae blackish, somewhat stout, shorter than distance from the apex of head to tip of the posterior process; antennal segment I stout, constricted in the middle, almost twice as long as II which is also stout; antennal segment III somewhat stout, almost twice as long as IV. Pronotum convex, coarsely pitted; disc black, conspicuously tricarinate; carinae pale; posterior process elongated, pointed, areolate, light brown; paranota narrow, converging anteriorly, yellowish, with the areolae anteriorly biseriate to uniseriate at humeri, the areolae rounded; collar brown, slightly raised and concave in front, areolate. Elytra with costal area rather broad (approximately two-thirds as wide as discoidal area), testaceous, hyaline, usually with two rows of areolae, sometimes triseriate at widest portion, areolae subquadrangular; subcostal area, brown to dark, almost as wide as costal area, biseriate with very small cells; discoidal area approximately one-third wider than costal area, long, extending about two-thirds total length of elytron, infuscate, with small and crowded areolae; sutural area hyaline, basally infuscate, intermediate portion pale, apex testaceous. Ventral area with buccu-

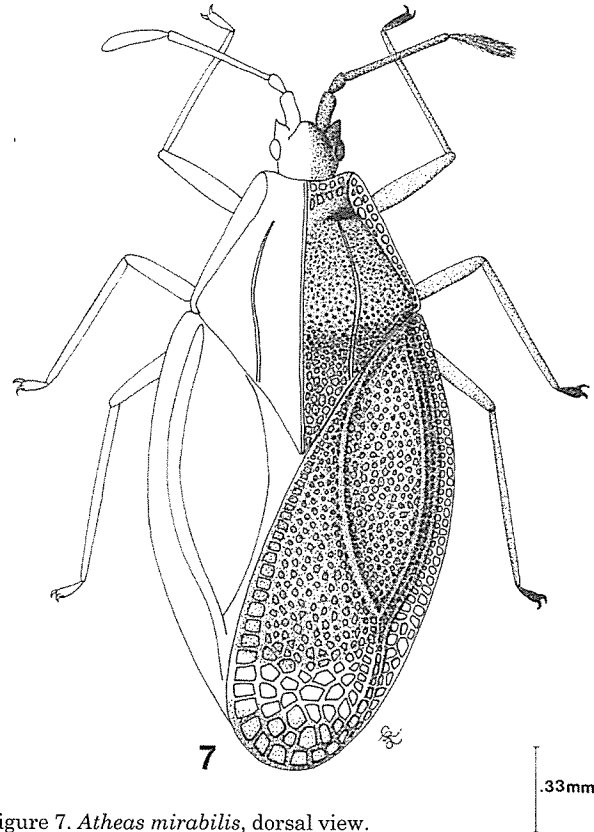


Figure 7. *Atheas mirabilis*, dorsal view.

la black except pale margins; rostrum reaching mesosternum; rostral laminae very conspicuous, yellowish; mesosternal laminae converging at middle. Legs light brown or yellowish-brown, tarsi dark.

**Geographic distribution.** Mexico (Edo. de Mex., Mich.).

**Host plants.** unrecorded.

**Comments.** *Atheas mirabilis* resembles *A. nigricornis*, but can be separated from it by its anteriorly biseriate paranota, which in *A. nigricornis* is anteriorly uniseriate with an inner elongated cell, instead of a second row of areolae. Also, the coloration of the elytra is mostly black in *A. mirabilis*, while it is lighter, from pale to testaceous in *A. nigricornis*. An allotype from Temascaltepec, Estado de Mexico, Mexico, was examined (USNM).

***Atheas nigricornis* Champion**

(Fig. 8)

*Atheas nigricornis* Champion, 1898: 45

**Description.** Length 2.5-2.6 mm; width 0.87-0.95 mm. Head black; antenniferous tubercles black, approximately as long as width of the first antennal segment, stout and pointed; antennae blackish, shorter than distance from the apex of head to the tip of posterior process, somewhat slender; antennal segment I almost twice as long as II; antennal segment III slender and twice as long as IV which is also slender. Pronotum moderately convex, coarsely pitted; disc black, conspicuously tricarinate; carinae pale to light brown; posterior process acuminate, varying in color from dark to pale; paranota uniseriately areolate with an elongated inner cell that is sometimes inconspicuous, especially on small specimens, the areolae subquadrate; collar truncate, blackish, with margins lighter, areolate. Elytra mostly pale to yellowish-brown; costal area broad (approximately two-thirds as wide as discoidal area), margins slightly curved, hyaline, slightly lighter than rest of elytron, with two rows of areolae although sometimes seeming to be basally uniseriate, (in some specimens three cells may be present at widest portion); subcostal area narrower than costal area, biseriately with very small cells; discoidal area approximately one-third wider than costal area, extending nearly two-thirds total length of elytron, with very small cells; sutural area sometimes slightly infuscate at apex, areolae hyaline, similar in size and shape to those on costal area. Ventral area with buccula dark with margins pale; rostrum, reaching posterior end of procoxa; rostral laminae conspicuous, margins pale; mesosternal laminae converging at the middle. Legs yellowish-brown with tarsi dark.

**Geographic distribution.** Mexico (Chis., D.F., Dgo., Edo. Mex., Gro., Hgo., Jal., Mich., Mor., NL., Oax., Ver.), U.S. (AZ, TX), Guatemala to Ecuador.

**Host plants.** *Alnus acuminata*, *Parosela citriodora*, Bromeliaceae

**Comments.** *Atheas nigricornis* can be separated from *A. tristis* by the costal area, which is uniseriate in *A. tristis* and biseriately in *A. nigricornis*. Also, the discoidal area is three times as wide as the costal area in *A. tristis*, while in *A. nigricornis* it is one-third wider than the costal area. The darker coloration of the elytra in *A. tristis* also separates them. *Atheas nigricornis* can be separated from *A. mirabilis* by its uniseriately areolate paranota with an elongated inner cell, which in *A. mirabilis* is biseriately. A syntype from Real de Arriba, Temas-

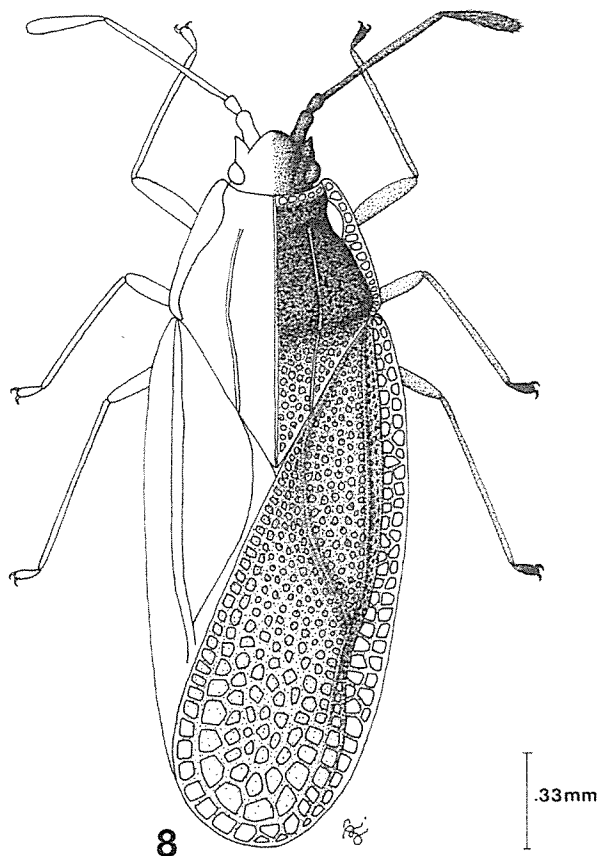


Figure 8. *Atheas nigricornis*, dorsal view.

caltepec, Estado de Mexico, Mexico, was examined (USNM).

#### *Atheas tristis* Van Duzee

(Fig. 9)

*Atheas tristis* Van Duzee, 1923: 143.

**Description.** Length 2.19-2.3 mm; width 0.76 mm. Head black; antenniferous tubercles black, approximately as long as width of the first antennal segment, stout and subacute; antennae entirely black, shorter than distance from apex of head to tip of triangular process; antennal segment I about twice as long as II; antennal segment III one and one-half to two times as long as IV, both slender. Pronotum moderately convex, coarsely pitted; disc black, tricarinate; carinae low, brown to pale, center portion darker; posterior process acuminate, infuscate to light brown and sometimes yellowish; paranota converging anteriorly with margins slightly sinuate, uniseriate with an elongated inner cell