

Revision of the genus *Arma* Hahn (Hemiptera : Pentatomidae : Pentatominae : Asopini) with description of two new species from Turkey

Imtiaz AHMAD*

Feyzi ÖNDER**

Summary

The Palaearctic genus *Arma* Hahn is revised and redescribed alongwith its known species *custos* (Fabricius) and *insperata* Horvath with descriptions of two new species *neocustos* and *neoinsperata* from various areas of Turkey, specially on the basis of metathoracic scent gland complex and male and female genitalia. A key to the above species based on the above characters are given.

Introduction

The asopine stink bug Palaearctic genus *Arma* Hahn feeding on leaf-eating caterpillars was mostly unknown with reference to its genitalia except the parameres illustrated by Seidenstücker (1975). Lodos and Önder (1983) mostly following Stichel (in the text) and Seidenstücker (op.cit.) and reviewing the earlier literature gave the key to its known species *custos* (Fabricius) and *insperata* Horvath and commented on their occurrence, distribution and feeding behaviour. Presently *Arma* is revised and redescribed with *custos* and *insperata* alongwith descriptions of two new species *neocustos* and *neoinsperata* from different parts of Turkey with special reference to metathoracic scent gland complex and male and female genitalia. A key to the above species, on this basis, is given. The material formed part of collection at the Department of Entomology, Faculty of Agriculture, Ege University, Izmir, Tur-

* Department of Zoology, University of Karachi, Karachi 32, Pakistan

** E. Ü. Ziraat Fakültesi, Bornova-Izmir, Turkey

Alınış (Received) : 30.6.1989

key. In the male genitalia the inflation of the aedeagus was made following Ahmad (1986). For female genitalia specially the spermatheca and for descriptions and measurements the technique of Ahmad and Rana (1988) was generally followed. Median pronotal length is given in parentheses. All the measurements are in millimetres.

Results

Arma Hahn

Arma Hahn, 1832. Die Wanzenartigen Insecten 1 : 81-118.

Arma : Stichel, 1960-1962. Illustrierte Bestimmungstabellen der Wanzen Europa 4 : 768 (for synonymy).

Body obovate; labium passing much beyond mesocoxae and sometimes reaching metacoxae. Pronotum with anterolateral margins slightly to strongly sinuate and markedly crenulate, humeri produced outward into blunt or sharply angulate lobes; metathoracic scent gland complex with developed peritreme and partially developed evaporatoria; forefemora simple without a spine; foretibiae with a distinct spine. Abdomen longer than broad, unarmed at base; ventroposterior margin of 7th ♀ abdominal sternum medially deeply concave, lateral angles subacute.

Male genitalia: Pygophore slightly broader than long, ventroposterior margin medially concave, at sides markedly convex, sometimes produced into marked lobes, lateroposterior lobes prominent, apex usually markedly acute or subacute, posterolateral openings covered with dentate plate; paramere more or less 1-shaped, apex of blade axe-shaped, with one end projected sometimes into a finger-like extension, base of blade with a thumb-like process; inflated aedeagus with bilobed dorsal membranous conjunctival appendage with acutely pointed sclerotized apical lobes, acutely pointed and well developed penial lobes enclosing very short vesica, with pair of acutely pointed dorsolateral thecal projections.

Female genitalia : First gonocoxae medially placed, close to each other; 9th paratergites usually reaching or slightly passing beyond posterior margin of 8th paratergites; arcus, triangulin and 2nd gonocoxae somewhat sclerotized and medially slightly exposed; spermathecal bulb round or somewhat oval, pump region short but median dilation remarkably developed enclosing remarkably developed sclerotized rod, distal duct shorter than proximal duct.

Type species : Arma custos (Fabricius)

Comparative note: Arma appears most closely related to Rhacognathus Fieber but can easily be separated from the same by its much longer 2nd antennal segments which are about 2x as long as 3rd as compared to much shorter 2nd antennal segment more or less equal to 3rd and by other characters.

Key to the species

1. Paraclypei equal to clypeus, labium usually reaching hind coxae, humeri somewhat blunt, not projecting into acute lobes, lateral margins of

pronotum beyond humeri anteriorad more or less straight, paramere with a prominent inner tooth, spermathecal bulb somewhat rectangular *insperata* Horvath

- Paraclypei slightly but distinctly longer than clypeus, labium usually slightly but distinctly short of hind coxae, humeri projecting into acute lobe, lateral margins of pronotum beyond humeri anteriorad markedly sinuate, paramere without an inner tooth, spermathecal bulb round or roundly oval 2
- 2. Somewhat larger species (♀ about 15.0 mm in length), scutellar length distinctly more than $1 \frac{1}{6}$ x scutellar width and much shorter than $1 \frac{1}{3}$ x distance apex scutellum-apex membrane, 2nd antennal segment at least slightly longer than $1 \frac{1}{2}$ x length of 5th, paraclypei in front of eyes only slightly convex, not prominently lobe-like, 1st gonocoxae in female with posterior margin near apex markedly concave, spermathecal bulb somewhat oval *neoinsperata* sp. n.
- Somewhat smaller species (♀ less than 14.0 mm in length), scutellar length distinctly less than $1 \frac{1}{6}$ x scutellar width and slightly shorter than distance apex scutellum-apex membrane, 2nd antennal segment more or less equal to $1 \frac{1}{2}$ x length 5th, paraclypei in front of eyes markedly convex, forming a lobe, 1st gonocoxae in female with posterior margin near apex markedly convex, spermathecal bulb round 3
- 3. Second antennal segment subequal to or less than 2x length of 3rd, paraclypeal lobe in front of eye narrow, ventroposterior margin of pygophore at sides convex but not projected into marked lobes, paramere with apex of blade extended into a slender projection, 9th paratergites in female with outer margin more or less straight, not markedly constricted in middle *neocustos* sp. n.
- Second antennal segment slightly more than 2x length of 3rd, paraclypeal lobe in front of eye broad, ventroposterior margin of pygophore at sides produced into marked lobes, paramere with apex of blade markedly acute but not extended into a slender projection, 9th paratergites in female with outer margin markedly constricted in middle *custos* (Fabricius)

Arma custos (Fabr.)

(Figs. 1, 5, 9, 13 a and b, 16, 19, 22, 25 & 29)

Cimex custos Fabricius, 1794 : Ent. Syst. 4 : 94.

Arma custos: Stichel, 1960-62: Illustrierte Bestimmungstabellen der Wanzen Europa 4: 656, 768 (For synonymy and and for figs. 589 and 590)

Colouration: Body darkly pigmented on pale background with some black or pale portions; antennae with outer side of basal, 3rd except base and apex and 4th except basal $\frac{1}{4}$ black, remaining segments, labium and legs mostly pale; underside and connexiva pale with some black portions and pigments.

General shape: Elongately oval, subequal to or somewhat shorter than 2x maximum width of abdomen and always shorter than 2x width across humeri.

Head: Wider than long; paraclypei longer than clypeus, in front of eyes with a broad lobe, medially concave and beyond middle markedly convex, margins weakly reflexed; anteocular region slightly longer than remainder of head; 2nd antennal segment slightly longer than 2x length of 3rd and subequal to or slightly longer than $1 \frac{1}{3}$ x 4th, latter subequal to or slightly longer than 5th; labium not reaching to hind coxae; length anteocular region 1.1-1.2; length remainder of head 1.05-1.1; width 2.4-2.5; interocular distance 1.65-1.8; interocular distance including ocelli 1.05-1.1; length antennal segments: I 0.3-0.35, II 2.1-2.2, III 0.9-1.0, IV 1.4-1.5, V 1.3-1.45; length labial segments: I 1.2-1.3, II 1.8-1.85, III 1.1-1.2, IV 0.8-0.9.

Thorax and Abdomen : Pronotum anteriorly, more at sides, in front and behind callosities and posteriorly at sides and at base of humeri deflected, width distinctly more than 2x length, humeri acute, anterior margin smoothly convex following marked concavity, median carina posteriorly faint; length 3.0-3.3, width 6.4-7.6; scutellum tapering posteriorly before middle and medially depressed, length usually less than $1 \frac{1}{6}$ x width, and slightly shorter than $1 \frac{1}{4}$ x length apex scutellum-apex membrane; length 4.2-4.6, width 3.7-4.0; length apex scutellum-apex membrane 3.4-3.8; metathoracic ostiolar peritreme with posterior margin substraight or convex, outer margin round with apex directed slightly anteriorly, anterior margin faint; ventroposterior margin of 7th abdominal venter medially concavely sinuate with sides subacute. Total length ♂ 12.55-12.65; ♀ 13.4.

Male genitalia: Pygophore with ventroposterior margin at sides lobe-like, apical margin of dorso-lateral lobes round, inwardly very slightly pointed, teeth on anteriolateral inner, lobes as from above, inwardly less pronounced (fig.16); paramere with apex of blade subacute, more or less thumblike with inner margin concave at base, inner tooth absent (fig.19); inflated aedeagus with sclerotized apices of each lobe of median dorsal conjunctival appendage pointed and markedly curved, hook-like (fig.22).

Female genitalia: First gonocoxae with posterior margin at sides round but not lobe-like with inner apices subacute; 9th paratergites passing beyond posterior margin of 8th latter with triangular apices, outer margin prominently medially constricted, inner margin substraight; posterior margins of triangulin, 2nd gonocoxae and arcus convex (fig.25); spermathecal bulb smoothly round (fig.29).

Material examined : 2 ♂ 1 ♀ Lüleburgaz, Izmit, 25, 26-7-1973, 77, on Karaağaç (*Ulmus*), leg. A. Gürses.

Comparative note : This species could easily be separated from its closest ally *A. neocustos* by its much longer 2nd antennal segment which is at least slightly more than 2x length of 3rd and by other characters noted in the key.

Arma insperata Horvath

(figs. 2,6,10,14a and b,17,20,23,26 and 30)

Arma insperata Horvath, 1899: Termes. Fiz. 22: 445.

Colouration : Body lightly pigmented on pale background, with usually very little black portions, mainly on connexiva, 3rd antennal segment except base and apex and apical $\frac{1}{2}$ of 4th black, rest of anten-

nal segments, labium, legs, underside, with occasional black spots, pale, often tinged red.

General shape : Abovate, length slightly shorter than (σ) or much shorter than (Q) 2x maximum abdominal width and subequal to 2x width across humeri.

Head: Width subequal to length; paraclypei subequal to clypeus, margins in front of eyes broadly but slightly convex, sides prominently depressed, medially slightly constricted, beyond middle convex, apically substraight, antecular region subequal to remainder of head; 2nd antennal segment distinctly longer than 2x length of 3rd and usually distinctly more than 1 1/3x length of 4th, latter slightly longer than 5th, labium reaching to hind coxae; length of antecular region 1.2-1.25; length remainder of head 1.2; width 2.45-2.5; interocular distance 1.75-1.8; intercellar distance including ocelli 1.05; length antennal segments: I 0.3-0.35, II 2.2-2.3, III 0.9-1.05, IV 1.4-1.6, V 1.3-1.4; length labial segments: I 1.4-1.6, II 1.95-2.1, III 1.1-1.2, IV 1.0-1.05.

Thorax and abdomen: Pronotum anteriorly at sides and in middle of callosities and posteriorly deflected, width distinctly less than 2x length, humeri round, anterolaterally margins more or less straight, median carina not apparent, length 3.4-3.5 (2.7-2.8) width 6.6; scutellum tapering posteriad in middle and medially raised with median carina apparent, length usually subequal to or slightly more than 1 1/6 x width and slightly more than 1 1/4 x length apex scutellum-apex membrane; length 4.6-4.8, width 4.0; length apex scutellum-apex membrane 3.6; metathoracic ostiolar peritreme slanted posteriad with anterior and posterior margins substraight and outer margin round with apex slightly anteriorly directed; ventroposterior margin of 7th Q abdominal venter medially uniformly concave with sides round. Total length σ 13.3, Q 1.35-13.65.

Male genitalia: Pygophore with ventroposterior margin at sides broadly convex, apical margin of dorsolateral lobes convex, curving inwardly, terminating into an inner beak, teeth on anterolateral inner lobes, as seen from above more or less uniformly pronounced (fig.17); paramere with apex of blade sharply projected and inwardly curved terminating into a prominent inner tooth (fig.20); inflated aedeagus with sclerotized apices of each lobe of median dorsal conjunctival appendage pointed but not curved (fig.23).

Female genitalia: Posterior margin of 1st gonocoxae at sides round, lobe-like, with inner apices subround; 9th paratergites passing much beyond posterior margin of 8th paratergites (latter with round apices), outer margin prominently uniformly concave, inner margin prominently convex; posterior margins of triangulin, 2nd gonocoxae and arcus convex (fig.26); spermathecal bulb somewhat rectangular (fig.30).

Material examined: 1 σ Pazaryeri, 7.5.1973, Ahlat, by Seidenstücker; 2 Q Safranbolu, Çamlıyayla, 29.6.1980, 10.7.1986, meşe, hanımeli, det. by F. Önder 1980; 1 Q Ödemiş, 16.6.1982, Kestane.

Comparative note: This species appears isolated in *Arma* in having paraclypei subequal to clypeus and antero-lateral margins of pronotum nearly straight in addition to other features listed in the key and description.

Arma neocustos sp. n.

(Figs. 3, 7, 11, 15a and b, 18, 21, 24, 27 & 31)

Colouration: Body darkly but sparingly pigmented against pale background with some black portions scattered; 3rd antennal segment except base and apex and 2/3 apical portion of 4th black, remaining segments, labium, legs and underside pale, sometimes tinged red, latter too with black pigments and some black portions.

General shape: Elongately oval, length subequal to (σ) or somewhat shorter than (Q) maximum abdominal width and shorter than 2x width across humeri.

Head : Width head slightly shorter than length; paraclypei longer than clypeus and tending to enclose it around corners, margins in front of eyes narrowly convex, sides adjacent to eyes and middle of clypeus depressed, margins beyond narrow convex lobes prominently concave, beyond middle convex, apically tapering towards clypeus; antecular region equal to remainder of head; 2nd antennal segment slightly shorter or subequal to 2x length of 3rd and slightly longer than $1 \frac{1}{3}$ x length of 4th, latter usually subequal to 5th; labium not quite reaching to hind coxae; length of antecular region 1.1-1.15, length remainder of head 1.1-1.15, width 2.3-2.4; interocular distance 1.6-1.7; interocular distance including ocelli 1.0-1.05; length antennal segments: I 0.35-0.4, II 1.8-1.85, III 0.9-1.0, IV 1.25-1.3, V 1.2-1.3; length of labial segments: I 1.2-1.3, II 1.8, III 1.10, IV 0.8-0.85.

Thorax and abdomen: Pronotum anteriorly and posteriorly behind callosities, at sides and posteriorly at sides deflected, width distinctly more than 2x length, humeri sharply projected and acutely pointed, anterolateral margins concave, median carina posteriorly sometimes faintly apparent; length 2.9-3.1 (2.4-2.7), width 6.4-6.8; scutellum tapering posteriorly beyond middle and anteriorly arised, with median carina posteriorly apparent, length subequal to $1 \frac{1}{6}$ x width and subequal to $1 \frac{1}{6}$ x length apex scutellum-apex membrane; length 4.0-4.4, width 3.4-3.8; length apex scutellum-apex membrane 3.4-3.8; metathoracic ostiolar peritreme slightly slanted posteriorly with anterior and posterior margins straight, outer margin round, apex not anteriorly directed; ventroposterior margin of 7th Q abdominal venter medially slightly sinuately concave with sides subacute. Total length σ 12.0, Q 13.2.

Male genitalia: Pygophore with ventroposterior margin at sides broadly convex but not lobe-like, apical margin of dorso-lateral lobes more or less truncate, inwardly very slightly pointed, teeth on antero-lateral inner lobes, as seen from above, inwardly pronounced (fig. 18); paramere with apex of blade extended into a finger-like projection with

inner margin convex at base, inner tooth absent (fig.21); inflated aedeagus with sclerotized apices of each of median dorsal conjunctival appendage subround and slightly curved (fig.24).

Female genitalia: First gonocoxae with posterior margin at sides convexly tapering with inner apices subround; 9th paratergites slightly passing beyond posterior margin of 8th (latter with subround apices), outer margin slightly convex, inner margin somewhat round; posterior margins of triangulin, 2nd gonocoxae and arcus medially concave (fig.27); spermathecal bulb roundly ovate (fig.31).

Material examined: Holotype ♂ Lüleburgaz, 25.7.1973, on Karaağaç. Paratype 1 ♀ Ankara, 13.6.1955, N. Lodos, "with a tag Arma custos F., det. N. Lodos 1960".

Comparative note: This species could easily be separated with its closest ally A. custos by its slightly shorter 2nd antennal segments which are subequal to or slightly shorter than 2x length of 3rd and by other characters as listed in the key and descriptions.

Arma neoinsperata sp. n.
(figs. 4, 8, 12, 28 and 32)

Colouration: Body darkly pigmented on pale or light pinkish pale background with some black portions; outer margin of basal, 2nd, 3rd except basal and apical most portions, 4th except basal 1/3 portion black, rest of antennal segments, labium, legs pale, pigmented, underside pale, lightly pigmented, with spiracles sides of abdomen and a few scattered spots black.

General shape: Obovate, length subequal to or slightly longer than 2x maximum abdominal width and distinctly shorter than 2x width across humeri.

Head: Width head distinctly more than length; paraclypei longer than clypeus, margins in front of eyes slightly convex, without forming distinct lobes, sides adjacent to in front of eyes and anteriorly depressed, medially lateral margins concave, beyond middle convex, apically substraight; antecular region distinctly longer than remainder of head; 2nd antennal segment distinctly longer than 2x length of 3rd and also distinctly longer 1 1/3x length of 4th, latter subequal to or slightly longer than 5th; labium not quite reaching hind coxae; length of antecular region 1.3; length remainder of head 1.1-1.2, width 2.6-2.7; interocular distance 1.7-1.85; interocular distance including ocelli 1.2-1.25; length antennal segments: I 0.4-0.45, II. 2.1.-2.2, III 0.9-0.95, IV 1.3-1.45, V 1.25-1.3; length of labial segments: I 1.35-1.4, II 1.9-1.95, III 1.15-1.2, IV 0.9-0.95.

Thorax and abdomen: Pronotum anteriorly and posteriorly behind callosities, somewhat and at sides and posteriorly clearly deflected, width about 2 1/4x length, humeri sharply projected and raised upward, anterolaterally margins slightly tapering but substraight, median cari-

na only posteriorly and very faintly visible, length 3.5 (2.9-3.1), width 7.8-7.9; scutellum tapering posteriad but much beyond middle and anteriorly prominently raised, with median carina posteriorly apparent, length almost subequal to 1 1/4 x width but usually subequal or shorter than 1 1/6 x length apex scutellum-apex membrane; length 4.9-5.05, width 4.0-4.1; length apex scutellum-apex membrane 4.3-4.5, metathoracic ostiolar peritreme slender, elongate, slightly slanting posterolaterad with anterior and posterior margins straight but outer margin round, having apex anteriorly directed; ventroposterior margin of 7th ♀ abdominal venter medially smoothly concave with slight convexity at sides, slightly concave again with truncated sides. Total length ♀ 14.7-14.9. Males: Not available.

Female genitalia: Posterior margins of 1st gonocoxae at sides narrowly but prominently convex, lobe-like with inner apices slightly projected but subround; 9th paratergites distinctly passing beyond posterior margin of 8th (latter with subtriangular apices), outer margins nearly straight, inner margins remarkably round forming subacute apices at sides; posterior margins of triangulin, 2nd gonocoxae and arcus substraight (fig. 28); spermathecal bulb (fig.32) elongately oval.

Material examined: Holotype ♀ Lüleburgaz, 25.7.1973, Karaağaç (*Ulmus* sp.). Paratypes 7 ♀ Izmit, Ünye and Lüleburgaz, 17, 26-4, 4-5, 26-7, 1973, 1977, leg. F. Önder and A. Gürses, other data as holotype.

Comparative note: This species can easily be separated from its allies *custos* and *neocustos* by its longer hemelytra with length apex scutellum-apex membrane usually distinctly more than width scutellum and by other characters noted in the key.

Acknowledgement

The authors wish to thank Mrs. R. Duman, University of Ege, Faculty of Agriculture, Department of Plant Protection, for drawings. Rotary Int., USA, is acknowledged for awarding the 1st author the teachers grant to serve University of Ege, Izmir in the capacity of visiting Professor, for 6 months period.

Özet

Arma Hahn (Hem. : Pentatomidae : Pentatominae : Asopini) cinsinin revizyonuyla Türkiye'den iki yeni türün orijinal deskripsiyonu

Bu çalışmada Palearktik bir cins olan *Arma* Hahn'ın revizyonu yapılmakta, bilinen iki türünün [*A. custos* (Fabr.) ve *A. insperata* Horv.] redeskripsiyonu ve Türkiye'den iki yeni türün (*A. neocustos* sp. n. ve *A. neoinsperata* sp. n.) orijinal deskripsiyonlarıyla söz konusu türlerin teşhis anahtarı verilmektedir.

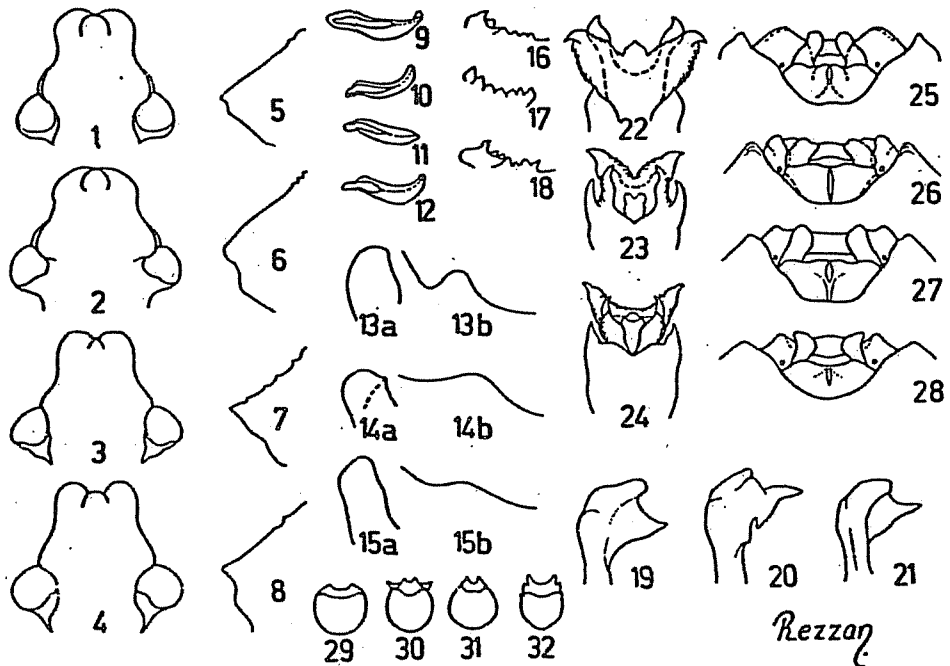
Literatür

Ahmad, I., 1986. A fool-proof technique for inflation of male genitalia in Hemiptera (Insecta). *J. ent. Soc. Kar.*, 1 (2) : 111-112.

Ahmad, I. and N. A. Rana, 1988. A revision of the genus Canthecona Amyot et Serville (Hemiptera:Pentatomidae:Pentatominae:Asopini) from Indo-Pakistan subcontinent with description of two new species from Pakistan. Türk entomol. derg., 12 (2) : 75-84.

Lodos, N. and F. Önder, 1983. Contribution to the study on the Turkish Pentatomidea (Heteroptera) VI. Asopinae (Amyot et Serville) 1843. Türk. Bit. Kor. Derg., 7 : 221-230.

Seidenstücker, G. 1975. Über anatolische Schildwanze (Heteroptera : Pentatomidae). Reichenbachia, 15 (30):259-268.



Figs. 1-32, species of *Arma* Hahn: 1-4. Head, dorsal view, 1. *custos*; 2. *insperata*; 3. *neocustos*; 4. *neoinsperata*. 5-8. Pronotum, showing humeral angle and lateral margin, 5. *custos*; 6. *insperata*; 7. *neocustos*; 8. *neoinsperata*. 9-12. Metathoracic scent complex, ventral view, 9. *custos*; 10. *insperata*; 11. *neocustos*; 12. *neoinsperata*; 13-24. Male genitalia, 13-18. Pygophore, 13a-15a, dorso-lateral lobe, 13a. *custos*; 14a. *insperata*; 15a. *neocustos*; 13b-15b, side of ventro-posterior margin, 13b. *custos*; 14b. *insperata*; 15b. *neocustos*; 16-18, teeth, 16. *custos*; 17. *insperata*; 18. *neocustos*; 19-21. Paramere, inner view, 19. *custos*; 20. *insperata*; 21. *neocustos*; 22-24. Inflated aedeagus showing exo- and endosoma, ventral view, 22. *custos*; 23. *insperata*; 24. *neocustos*. 25-32. Female genitalia, 25-28. Terminalia, Ventral view, 25. *custos*; 26. *insperata*; 27. *neocustos*; 28. *neoinsperata*; 29-32. Spermatheca, dorsal view, 29. *custos*; 30. *insperata*; 31. *neocustos*; 32. *neoinsperata*.