Breddin’s types of *Ochlerus* (Hemiptera, Pentatomidae, Discocephalinae)

With 43 figures and 1 table

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**Summary**

After more than a century, the type specimens of the Pentatomidae genus *Ochlerus* Spinola, 1837 described by Gustav Breddin are revised. Due to unfortunate circumstances, the author left most of the related work incomplete and it resulted in the possible mislabeling of the type material, as well as a change in the institutions where they should be deposited. Types are assigned to the following species: *Ochlerus bergrothi*, *O. bistillatus*, *O. communis*, *O. cotylophorus*, *O. dentijugis*, *O. handlirschi*, *O. incisulus*, *O. notatulus*, *O. profanus*, *O. rusticus*, *O. signoreti*, *O. stylulatus*, and *O. tenuicornis*. The male of *O. tenuicornis* is transferred to a new species, *Ochlerus breddini*.

**Key words**

Heteroptera, Ochlerini, stink bug, *Phytomonas*, palm trees

**1. Introduction**

With a worldwide distribution (except in polar regions), Pentatomidae is listed as the fourth in diversity among the Heteroptera (Grazia et al. 2012). These insects are highly related to cultivated plants such as soybeans and palm trees, among others, and constantly reported as plagues, which highlight its impact to economy (Panizzi et al. 2000). The family is divided into 10 subfamilies, six of which occur in the Neotropical region (Rider, 2014). One of such subfamilies is Discocephalinae, where the genus we deal with in the present paper is placed. *Ochlerus* Spinola, 1837 has a record of unresolved taxonomy and classification matters, having its monophyly recently disputed (Campos & Grazia, 2006). Being the type genus for the tribe Ochlerini, surprisingly it has not received significant attention from taxonomists and systematists alike, besides the diagnosis by Rolston

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(1992). While the last description of a new species dates back to BREDDIN'S (1910) 13 species (Tab. 1), only the recent unveiling of HERRICH-SCHÄFFER'S (1844) Ochlerus types have somewhat dealt with the confusing history of the genus (SIMÕES & CAMPOS; 2014) and brought the total number to 17 species (Tab. 1). Solving taxonomic issues such as the identity of the species of Ochlerus is also of interest to crop protection, since the genus has been known for its possible role as vector of the parasitic Phytomonas spp. trypanosomatids (DOLLET et al. 1993, CAMPOS & GRAZIA 2006, GITAU et al. 2009).

Arguably the longest and most detailed paper to date on Ochlerus, Gustav Breddin's work in 1910 was a posthumous publication due to his untimely passing away in 1909 while finishing the descriptions (SCHRÖTER 1910). The death of the author resulted in specimens which Breddin used as basis for his paper being deposited at the Naturhistorisches Museum Wien, Vienna, Austria. Although we could not access the material due to logistical issues, we managed to define several of the type specimens from the species Breddin described, albeit not managing to find all males and females types. Thus, a review of the specimens which Breddin used as basis for his paper is given, followed by a brief discussion on the reasons for type designation. Also, we found out that the male and female of Ochlerus tenuicornis BREDDIN, 1910 are not conspecific. This last issue led us to describe a new species for the genus.

2. Material and Methods

Specimens belong to the American Museum of Natural History (AMNH), the Carnegie Museum of Natural History (CMNH), Joseph E. Eger collection (JEE), the National Museum of Natural History (USNM), the Naturhistorisches Museum Wien, Vienna, Austria (NMW), and the Senckenberg Deutsches Entomologisches Institut at Müncheberg, Germany, which hosts most of Breddin's own collection since 1910 (HORN et al. 1990). Through careful examination of the specimens and by matching label information, drawings and descriptions, we managed to define several of the type specimens from the species Breddin described, albeit not managing to find all males and females types. Thus, a review of the specimens which Breddin used as basis for his paper is given, followed by a brief discussion on the reasons for type designation. Also, we found out that the male and female of Ochlerus tenuicornis BREDDIN, 1910 are not conspecific. This last issue led us to describe a new species for the genus.

3. Results and Discussion

3.1. Review of the syntypes

3.1.1. Ochlerus bergrothi BREDDIN, 1910 (pp. 624–625) (figs 1, 16)

Type material (examined): Male, here designated as lectotype, deposited at the SDEI; females of Ochlerus bergrothi B. BREDDIN, 1910 are lost in the bombardment of the Hamburg Museum during World War II (WEIDNER 1972, STEPHAN M. BLANK & FRANK WIELAND pers. comm.). The other missing syntypes may be deposited at the Forschungsinstitut und Naturmuseum Senckenberg at Frankfurt am Main (SMF), however we could not access the material due to logistical issues. Photographs of loaned specimens were taken and composed with a Nikon AZ100M microscope.

Type locality: San Esteban, Carabobo, Venezuela.

Tab. 1: List of valid species of Ochlerus in alphabetical order.

| Species                | Author    | Year |
|------------------------|-----------|------|
| Ochlerus bergrothi     | Breddin   | 1910 |
| Ochlerus bistillatus   | Breddin   | 1910 |
| Ochlerus breddini      | Simões & Campos | –   |
| Ochlerus cinctus       | Spinola   | 1837 |
| Ochlerus circummaculatus | Stål    | 1860 |
| Ochlerus communis      | Breddin   | 1910 |
| Ochlerus coriaceus     | Herrich-Schäffer | 1844 |
| Ochlerus corylophorus  | Breddin   | 1910 |
| Ochlerus dentijugis    | Breddin   | 1910 |
| Ochlerus handlirschi   | Breddin   | 1910 |
| Ochlerus incisulus     | Breddin   | 1910 |
| Ochlerus latosus       | Herrich-Schäffer | 1844 |
| Ochlerus notatulus     | Breddin   | 1910 |
| Ochlerus profanus      | Breddin   | 1910 |
| Ochlerus rusticus      | Breddin   | 1910 |
| Ochlerus signoreti     | Breddin   | 1910 |
| Ochlerus stylulatus    | Breddin   | 1910 |
| Ochlerus tenuicornis   | Breddin   | 1910 |
Comments: The specimen is in fairly good condition and its wings are extended. Although not specified by Breddin nor available on the labels, the country and department of the type locality can be retraced in Reuter (1891).

3.1.2. Ochlerus bistillatus Breddin, 1910 (pp. 618–619) (figs 2, 17)

Type material (examined): Lectotype ♂, designated by Gaedike (1971), deposited at the SDEI; ‘Bolivia | Ochlerus bistillatus | coll. Breddin | Lectotypus | des. M. Gaedike 1968 | DEI Müncheberg Hemi - 00030’; labels added: ‘Lectotype Ochlerus bistillatus Breddin, 1910’; 1 paral ectotype ♂, designated by Gaedike; ‘Peru, Amaz. | Ochlerus bistillatus | coll. Breddin, Paralectotypus | des. M. Gaedike 1968 | DEI Müncheberg Hemi - 00031’ (SDEI), labels added: ‘Paralectotype Ochlerus bistillatus Breddin, 1910’.

Type locality: Bolivia.

Comments: Two females were found in the SDEI collection, as described by Breddin. Gaedike’s (1971) type designations seem to be in accordance with Breddin's descriptions. The lectotype is in a better state of preservation.

3.1.3. Ochlerus communis Breddin, 1910 (pp. 616–617) (figs 3, 18)

Type material (photograph examined): 1 male, here designated as lectotype, deposited at the NMW; ‘marginatus F. det. Mayr. | Shf’. Labels added: ‘Lectotype Ochlerus communis Breddin, 1910’.

Type locality: Unknown.

Comments: Breddin (1910) based his description on five males, deposited at the NMW (4 specimens) and the Hamburg Museum (one specimen). In addition, he associated one female deposited at the NMW, but he indicated the identification as doubtful. We were able to find one male deposited at the NMW. The original description and, mainly, the drawing of the female genitalia of O. communis, point to a synonymy with Ochlerus cinctus Spinola, 1837. In fact, Breddin himself stated that: "[It is] A common species in old collections, and perhaps identical to ‘O. marginatus’ Fab." However, despite being correct about the species being similar to O. cinctus (Cimex marginatus is a preoccupied name according to Kirkaldy, 1909), we cannot be sure if they are conspecific, as O. cinctus is only known from females and we could not find the female syntype of O. communis.

3.1.4. Ochlerus cotylophorus Breddin, 1910 (pp. 621–622) (figs 4, 19)

Breddin based his description on females from Marcapata, Peru, but we cannot be sure if they are in the SDEI collection. Three specimens from Colombia and Ecuador were found to match the illustration of the genitalia and the description of O. cotylophorus.

Type locality: Peru.

Material examined: 1 female, deposited at the SDEI; ‘Coca (Ecuador) R. Haensch S. | coll. Breddin | DEI Müncheberg HEMI-00025’; labels added: ‘Ochlerus cotylophorus det. Simões & Campos, 2015’. 1 female, COLOMBIA, Province unknown: Esmeralda, 'Columbia Esmeralda Province unknown: Esmeralda, | coll. Breddin | Ochlerus cinctus Spin. | det. HG Barber = marginatus Fab. | DEI Müncheberg HEMI-00020’ (SDEI), labels added: ‘Ochlerus cotylophorus det. Simões & Campos, 2015’. 1 female, COLOMBIA, 'Columbien, | coll. Breddin | Ochlerus dentijugis | Barber revid. 1933 | DEI Müncheberg HEMI-00021’ (SDEI), labels added: ‘Ochlerus cotylophorus det. Simões & Campos, 2015’.

Type locality: Peru.

Comments: Across the types of Ochlerus described by Breddin, there are indications to poorly matched and/or erroneous labels for some species (see O. profanus and O. rusticus). That may have been the case for O. cotylophorus as well. There is a fourth specimen from Peru which was found next to these other three and may be one of the syntypes. It has a matching general morphology, despite the fact that it lacks the abdomen; since the latter is a diagnostic structure we decided to not include it as a lectotype or syntype.

3.1.5. Ochlerus dentijugis Breddin, 1910 (pp. 623–624) (figs 5, 20)

Type material (examined): Male, here designated as lectotype, deposited at the SDEI; ‘Peru Amaz. | Ochlerus profanus | coll. Breddin | DEI Müncheberg HEMI-00027’; labels added: ‘Lectotype Ochlerus dentijugis Breddin, 1910’.

Type locality: Peru.

Comments: The diagnostic feature of the lateral projection on the mandibular plates and the shape of the pygophore, much different from the other species, lead us to the conclusion that this specimen is a syntype of O. dentijugis. Breddin stated that the specimen on which he based his description originated from Colombia, however the label pinned with the syntype states otherwise, again leading to the possibility that some labels are mixed and/or misplaced.
3.1.6. *Ochlerus handlirschi* BREDDIN, 1910 (pp. 622–623)  
(figs 6, 21)

**Type material** (examined): Female, here designated as lectotype, deposited in the SDEI; 'Cozumel Yucatan 1882 | coll. Breddin | DEI Müncheberg HEMI-00003', labels added: 'Lectotype *Ochlerus handlirschi* Breddin, 1910'.

**Type locality**: Cozumel, Yucatán, Mexico.

**Comments**: Although it should have been deposited in the NMW (BREDDIN, 1910: 623) a sole syntype of *O. handlirschi* could be located in the SDEI. This easily diagnosable species, due to the shape of the posterior margin of the gonocoxites 8, has had its position in *Ochlerus* questioned by CAMPOS & GRAZIA (2006).

3.1.7. *Ochlerus incisulus* BREDDIN, 1910 (pp. 628–629)  
(figs 7–8, 22–23)

**Type material** (examined): Lectotype ♂, designated by Gaedike (1971), deposited at the SDEI; 'Mérida Venez. | ♂ | Typus | *Ochlerus incisulus* ♂ Type Bredd[en] | coll. Breddin | Lectotypus | Des. H. Gaedike 1968 | DEI Müncheberg HEMI-00034', labels added: 'Lectotype *Ochlerus incisulus* Breddin, 1910'; 1 female paralectotype; 'Mérida | Venezuela 1884 | ♂ | Typus | *Ochlerus incisulus* ♀ Type Bredd | Paralectotypus | Des. H. Gaedike 1968 | DEI Müncheberg HEMI-00034' (SDEI), labels added: 'Paralectotype *Ochlerus incisulus* Breddin, 1910'.

**Type locality**: Mérida, Mérida, Venezuela.

**Comments**: Breddin described the species based on a male and a female. The syntypes are deposited in the SDEI collection, although the female should have gone to the NMW (BREDDIN, 1910: 629). Again, GAEDIKE (1971) type designations are in accordance with Breddin's descriptions.

3.1.8. *Ochlerus notatulus* BREDDIN, 1910 (pp. 627–628)  
(figs 9, 24)

**Type material** (examined): Female, here designated as lectotype, deposited at the NMW; 'Ochlerus notatulus Type Bredd. | Brasilien', labels added: 'Lectotype *Ochlerus notatulus* Breddin, 1910'; 1 female, here designated as paralectotype, 'Brasilien | coll. Breddin | DEI Müncheberg HEMI-00024' (SDEI), labels added: 'Paralectotype *Ochlerus notatulus* Breddin, 1910'; 1 female, here designated as paralectotype, labels: 'Brasil | Coll. Signoret | sordidus det. Signoret coll. Breddin | DEI Müncheberg HEMI-00032' (SDEI), labels added: 'Paralectotype *Ochlerus notatulus* Breddin, 1910'.

**Type locality**: Brazil.

**Comments**: According to Breddin, the specimens should have been deposited at the NMW (BREDDIN, 1910: 628). Apparently only one of these was sent to the museum, while two are deposited in the SDEI. The NMW syntype was chosen as lectotype due to better preservation and having more complete appendices.

3.1.9. *Ochlerus profanus* BREDDIN, 1910 (pp. 619–620)  
(figs 10, 25)

**Type material** (examined): Female, here designated as lectotype, deposited at the SDEI; 'Peru Amaz. | coll. Breddin | DEI Müncheberg HEMI-00029'. 1 female, here designated as paralectotype, 'Bahia Felder 853 | marginatus det. Stal | coll. Breddin | DEI Müncheberg HEMI-00016'.

**Type locality**: Marcapata, Peru.

**Comments**: Out of the examined specimens from the SDEI collection, three were determined to either belong to *O. profanus* or *O. rusticus*. Two of these have the same locality labels (i.e. 'Peru, Amaz.') and would fit with the type locality of *O. profanus*, as described by BREDDIN (1910). However, upon close inspection of the genitalia and general morphology, it is clear that these two specimens are not conspecific, with one of them (collection label HEMI-00029) matching Breddin's description of *O. profanus* and the second (collection label HEMI-00023) matching that of *O. rusticus*, even though GAEDIKE (1971) labeled it as *O. profanus*. The third specimen (collection label HEMI-00016) also fits with the description of *O. profanus*, but is labeled as provenient from Bahia, Brazil. Thus, our conclusion on this matter is that the paralectotype of *O. profanus* likely had its labels changed with the lectotype of *O. rusticus*. However, we decided on keeping the labels in the same specimens and simply added new labels with our identification. Type specimens for *O. profanus* var. *praetextatus* were not found.

3.1.10. *Ochlerus rusticus* BREDDIN, 1910 (pp. 620–621)  
(figs 11, 26)

**Type material** (examined): Female, here designated as lectotype, deposited at the SDEI; 'Peru Amaz. | *Ochlerus profanus* | coll. Breddin | Typus | Syntypus | DEI Müncheberg HEMI-00023'.

**Type locality**: Bahia, Brazil.

**Comments**: See comment section in *O. profanus*. The probably misplaced labels were kept in the specimens, with new labels with our identification added to the lectotype.
Type material (photograph examined): Male, here designated as lectotype, deposited at the NMW; ‘Cayenne Coll. Signoret | coriaceus det. Signoret | Ochlerus signoreti & Type Bredd.[in]’ | Labels added: ‘Lectotype Ochlerus signoreti BREDDIN, 1910’.

Type locality: Cayenne, Cayenne, French Guiana.

Comments: Breddin described *O. signoreti* male and female syntypes. Both should have been deposited at the NMW, but only a male syntype was retrieved.

3.1.12. *Ochlerus stylulatus* BREDDIN, 1910 (pp. 629-631)  
(figs 13, 28)

Type material (examined): Female, here designated as lectotype, deposited at the SDEI, Müncheberg, Germany; ‘Peru Amaz. | coll. Breddin | DEI Müncheberg HEMI-00028’ | Labels added: ‘Lectotype Ochlerus stylulatus BREDDIN, 1910’.

Type locality: Marcapata, Peru.

Comments: Only the one female syntype was found at the SDEI. The male should have been deposited in Breddin’s own collection. As drawn by Breddin, the right plate of the gonocoxites 8 was removed in the collections which we could examine the specimens, it may very well be deposited at the Senckenberg Museum at Frankfurt (SMF) (Stephan M. Blank, pers. comm.).

3.1.13. *Ochlerus tenuicornis* BREDDIN, 1910 (pp. 626-627)  
(figs 14, 29)

Type material (examined): Female holotype, deposited at the SDEI; ‘Venezuela | coll. Breddin | Barber revid. 1933 | Holotypus | DEI Müncheberg HEMI-00035’.

Type locality: Venezuela.

Comments: Although one male syntype should have been deposited at the Hamburg Museum (BREDDIN, 1910: 627), the two syntypes (one male and one female) are housed at the SDEI. These specimens happen to be not conspecific. Breddin himself doubted the identification of the associated male, since the females and the male are from distant localities and bear only general similarities, such as the shape of the pronotum. Thus, the male paralectotype (figs 15, 30) is transferred to *Ochlerus breddini* spec. nov. described below.

3.1.14. *Ochlerus breddini* SIMÕES & CAMPOS spec. nov.  
(figs 15, 30-43)

Etymology: The name of the species is an homage to the late Gustav Breddin, a researcher who made significant contributions to *Ochlerus* and who described most of its currently known species.

Diagnosis: Body light to dark brown, ventral facies yellow speckled. Rostrum not surpassing urosternite V. Anterolateral angles of the pronotum slightly produced laterad with a rounded apex. Small yellow maculae laterad to apex of radial veins. For a more accurate diagnosis, see description of genitalia.

Type material: Holotype, ♂, BOLIVIA, Santa Cruz: El Refugio Los Volcanes, 3400-4200 ft., 16-20 IX 2012, P. Skelley, J. Hamel, J. Wappes & T. Bonaso cols. [-17.4525; -63.6502], S 18°06' W 063°36' (JEE).

Type locality (examined): Tipuani, La Paz, Bolivia.

Distribution: BOLIVIA (Cochabamba, La Paz, Santa Cruz), ECUADOR (Pastaza), PERU (Loreto, Ucayali).

Paratypes: BOLIVIA, Cochabamba: 3 ♀, Carrasco (El Sacta) 220 m, 26.X.02, Morris & Wappes cols. [-17.3833; -63.1500] (JEE); 1 ♀, Cristal-Mayu, Prov. Chapare, Rio Cristal Mayu 50 mi NE Cochabamba, 5.XI.1944, L. Pena col. [-17.0065; -65.6413], J. C. Lutz Collection 1961, Ochlerus sp. LHR’84, Loan from USNMH 2068402, USNM (USNM); 1 ♂, Cristal-Mayu, Prov. Chapare, 12.IV.1950, Luis E. Pena col. [-17.0065; -65.6413], J. C. Lutz Collection 1961, Ochlerus sp. LHR’84, Loan from USNMNH 2068402, USNM (USNM); 1 ♀, Cristal-Mayu, Prov. Chapare, 12.IV.1950, Luis E. Pena col. [-17.0065; -65.6413], Loan from USNMNH 2068402, USNM (USNM); 1 ♀, Sajta, Prov. Chapare, XI.1993, collector unknown [coordinates unknown], Drake Collection, Loan from USNMNH 2068402, USNM (USNM); 1 ♀, Cristal-Mayu, Prov. Chapare, 12.IV.1950, Luis E. Pena col. [-17.0065; -65.6413], J. C. Lutz Collection 1961, Meland. circummac., Loan from USNMNH 2068402, USNM (USNM); 1 ♀, Sajta, Prov. Chapare, XI.1993, collector unknown [coordinates unknown], Drake Collection, Loan from USNMNH 2068402, USNM (USNM).

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Description: Medium sized (around 14.4 mm); body dark brown to black. Head longer than wide, matching inclination of pronotum; dorsal surface wrinkled with 1+1 evanescent yellow lines parallel to eyes and reaching anterior margin of pronotum. Clypeus ending before anterior margin of eyes. Apex of mandibular plates acute laterad, acute or truncate, base laterad of eyes. Cicatrices of antennal segments: I 0.15 ± 0.02 (0.13-0.19), II 0.26 ± 0.02 (0.25-0.29), V 0.27 ± 0.01 (0.25-0.28); length of antennal segments: I 0.1 ± 0.01 (0.09-0.11), II 0.11 ± 0.01 (0.1-0.11), III 0.2 ± 0.02 (0.16-0.24), IV 0.27 ± 0.01 (0.25-0.28); length of abdominal apex: 0.12 ± 0.01 (0.11-0.13), width 0.31 ± 0.01 (0.29-0.33), interocular distance 0.15 ± 0.01 (0.14-0.15); length of antennal segments: I 0.1 ± 0.01 (0.09-0.11), II 0.11 ± 0.01 (0.1-0.11), III 0.2 ± 0.02 (0.16-0.24), IV 0.27 ± 0.01 (0.25-0.28); length of rostral segments: I 0.15 ± 0.02 (0.13-0.19), II 0.26 ± 0.02 (0.23-0.29), III 0.22 ± 0.01 (0.2-0.24), IV 0.2 ± 0.02 (0.15-0.21); pronotal length 0.4 ± 0.02 (0.36-0.43), width 0.79 ± 0.04 (0.74-0.85); scutellar length 0.66 ± 0.02 (0.63-0.69), width 0.53 ± 0.02 (0.51-0.56), width at end of frenum 0.3 ± 0.02 (0.28-0.33); abdominal width 0.9 ± 0.04 (0.84-0.96).

Comments: The female genitalia resembles that of *O. profanus*, albeit much larger. In some specimens, the parameres overlap.

4. Final Considerations

Despite the uncertainty to respective whereabouts, most of the missing specimens may still be found in the aforementioned collections should a hemipterologist examine them. We also conclude that the death of Breddin left a few gaps in the type specimen organization, but in the big picture there were not as many mistakes as we could expect from an incomplete labeling process.
The decision on where the misdeposited specimens should be sent will be left for the respective curators and may be addressed in the near future. Finally, we hope that this study can help in the identification of specimens of Ochlerus, as well as in other studies delving into Breddin’s posthumous works.

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Figs 1–15: Type material of the species of Ochlerus described by Breddin, dorsal view. 1: O. bergrothi, ♂; 2: O. bistillatus, ♀; 3: O. communis, ♂; 4: O. cotylophorus, ♀ (voucher); 5: O. dentijugis, ♂; 6: O. handlirschi, ♀; 7: O. incisulus, ♂; 8: O. incisulus, ♀; 9: O. notatulus, ♀; 10: O. profanus, ♀; 11: O. rusticus, ♀; 12: O. signoreti, ♂; 13: O. stylulatus, ♀; 14: O. tenuicornis, ♀; 15: O. breddini spec. nov., ♂. Scale bars: 1 mm.
Figs 16–30: Type material of the species of *Ochlerus* described by Breddin, external genitalia, posterior view: 16: *O. bergrothi*, ♂; 17: *O. bistilatus*, ♀; 18: *O. communis*, ♂; 19: *O. catylophorus*, ♀ (voucher); 20: *O. dentijugis*, ♂; 21: *O. handlirschi*, ♀; 22: *O. incisulus*, ♂; 23: *O. incisulus*, ♀; 24: *O. notatulus*, ♀; 25: *O. profanus*, ♀; 26: *O. rusticus*, ♀; 27: *O. signoreti*, ♂; 28: *O. stylulatus*, ♀; 29: *O. tenuicornis*, ♀; 30: *O. breddini* spec. nov., ♂. Scale bars: 1 mm.
Fig. 31–43: General morphology and genital structures of *Ochlerus breddini* sp. nov.: 31: Body, dorsal view; 32: Head, dorsal view; 33: External male genitalia, posterior view; 34: Body, ventral view; 35: External female genitalia, posterior view; 36: Pygophore, posterior view; 37: Pygophore, lateral view; 38: Pygophore, dorsal view; 39: Female genital plates and internal structures; 40: *Pars intermediialis* and *capsula seminalis*; 41: Genital plates and receptaculum seminis; 42: *Phallus*, lateral view; 43: *Phallus*, ventral view.