

AMSTERDAM EXPEDITIONS TO THE WEST INDIAN ISLANDS, REPORT 11 *)

NEW HYPORHEIC WATER MITES FROM HAITI

by

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ABSTRACT

Four new hyporheic water mites, belonging to the genera *Neomamersa*, *Protolimnesia* and *Mixdea*, are described from a river in Haiti. Species belonging to the latter two genera are distinct enough to necessitate erecting the new subgenera *Voldroguella* and *Tubomixdea*. Nymphs belonging to *Rhyncholimnochaes* and *Omartacarus* were collected as well as *Xenomomonia subcentrata*, the latter previously described from Cuba.

RÉSUMÉ

Quatre espèces nouvelles d'Hydracariens hyporhéiques, des genres *Neomamersa*, *Protolimnesia* et *Mixdea*, sont décrites d'une rivière d'Haiti. Les espèces appartenant aux deux derniers genres mentionnés sont suffisamment distinctes pour rendre nécessaire la création des sous-genres nouveaux *Voldroguella* et *Tubomixdea*. Avec les espèces nouvelles, des nymphes appartenant aux genres *Rhyncholimnochaes* et *Omartacarus* ont été recueillies, ainsi que *Xenomomonia subcentrata*, espèce précédemment décrite de Cuba.

INTRODUCTION

Until recently no hyporheic water mites were known from the Caribbean region. However, published results of the Cuban-Roumanian Biospeological Expeditions to Cuba have included eight interstitial species from that country (Orghidan & Georgesco, 1977; Orghidan, Gruia, Georgesco & Bayés, 1977; and Orghidan & Gruia, 1980a, 1980b). Seven species have since been collected in Haiti, only one of which, *Xenomomonia subcentrata* Orghidan et al., is common to

the two islands. One nymphal specimen each of *Rhyncholimnochaes* and *Omartacarus*, the first records of these genera in the Caribbean region, were taken. It is possible that both are new species but it is difficult to fit nymphs into what is primarily a system based on adults and they are not described.

All specimens are from a single collection made by Dr. L. Botosaneanu and Mr. J. Notenboom during one of the University of Amsterdam West Indies Expeditions under the direction of Professor J. H. Stock. Following are the data for this collection: Material taken by the Karaman-Chapuis method of bailing out water into a net from a hole dug in fine gravel and sand deposits of an "island" 40 m long, in the Rivière Voldroque at Marché León (18°32'20" N 74°07'05" W, 4 December 1979); elevation only 80 meters, the area being nevertheless hilly; temperature in the collection hole 24.2° C, water clear. Interestingly, Dr. Botosaneanu informs me that although a rather large number of collections were made in what appeared to be ideal interstitial habitats (and these produced numerous hyporheic crustaceans), only the above site contained hydrachnids.

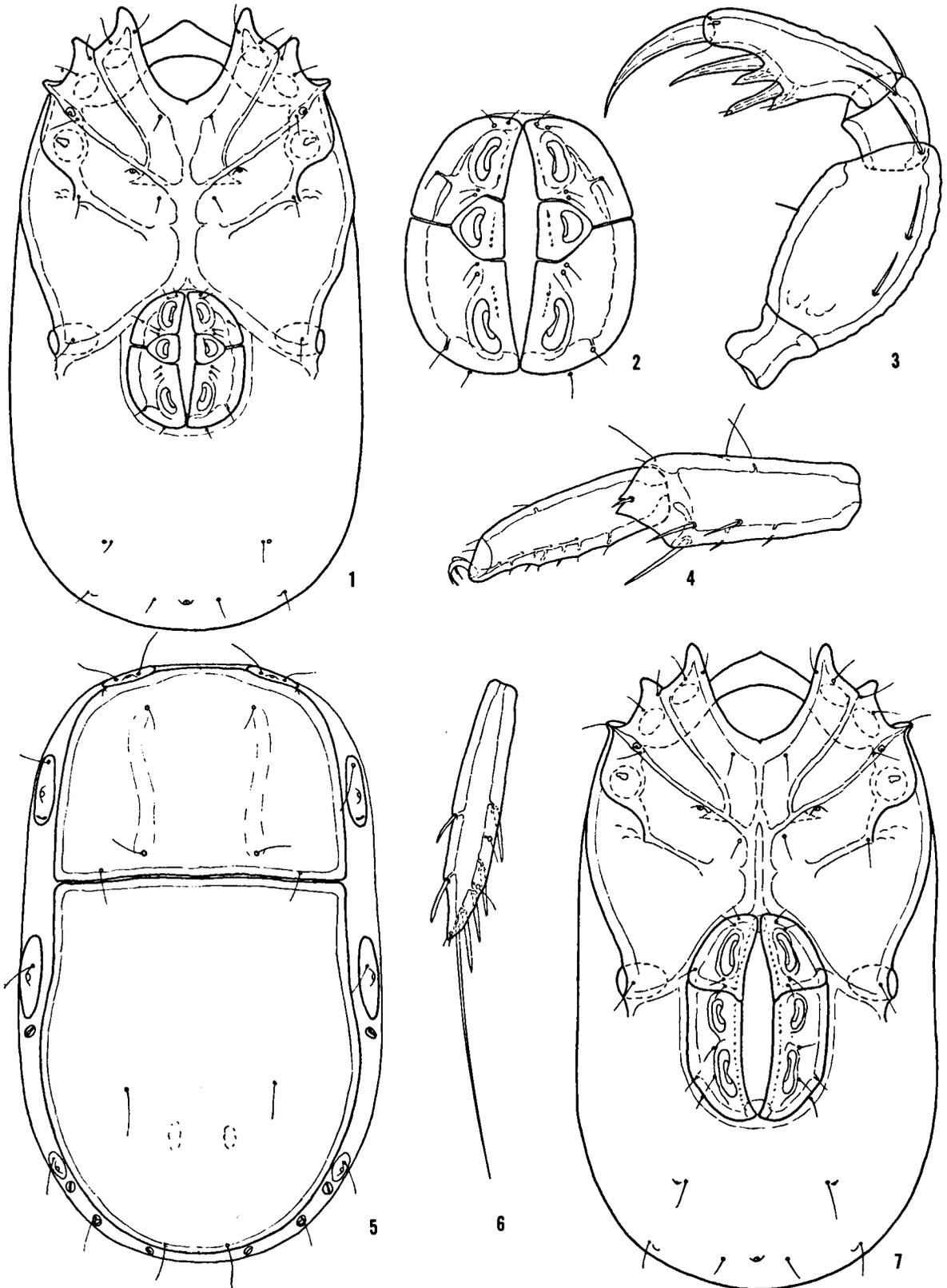
Holotypes and allotypes will be deposited in the Zoölogisch Museum, Universiteit van Amsterdam. In only one of the new species there are paratypes and the measurements of the latter are given in parentheses following the measurements of the primary type.

SYSTEMATIC DESCRIPTIONS

Family LIMNESIIDAE

Genus *Neomamersa* Lundblad

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Figs. 1-7. *Neomamersa haitiana* sp. nov.: 1, ventral shield, ♂; 2, genital field, ♂; 3, medial view of palp, ♀; 4, I-Leg-5 and 6, ♀; 5, dorsal shield, ♂; 6, IV-Leg-6, ♀; 7, ventral shield, ♀.

Neomamersa haitiana sp. nov. Figs. 1-7.

Male. — Dorsal shield 522 μm in length; anterior plate of dorsal shield 177 μm in length, 270 μm in width; posterior plate of dorsal shield 345 μm in length, 303 μm in width; glandularia platelets of the dorsal furrow relatively small, the pair flanking the middle of the body approximately 68 μm in length; only the glandularia platelets flanking the anterior plate of the dorsal shield incorporating lyrifissures (fig. 5); integumental and eye pigment absent; ventral shield 589 μm in length, 340 μm in width; genital field 130 μm in length, 114 μm in width; three pairs of genital acetabula, these tending to be somewhat constricted near middle; all acetabula on separate platelets (fig. 2); anterior portion of lateral edge of third coxae extending into anterolateral projection of body proper (fig. 1); dorsal lengths of the palpal segments: P-I, 30 μm ; P-II, 94 μm ; P-III, 43 μm ; P-IV, 87 μm ; P-V, 60 μm ; tubercles on ventral side of P-IV of moderate length; structure of palp as shown for the female; capitulum 124 μm in length; dorsal lengths of the distal segments of the first leg: I-Leg-4, 86 μm ; I-Leg-5, 93 μm ; I-Leg-6, 96 μm ; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 109 μm ; IV-Leg-5, 121 μm ; IV-Leg-6, 104 μm ; seta at tip of IV-Leg-6 broken; swimming hairs absent.

Female. — Dorsal shield 581 μm in length; anterior plate of dorsal shield 196 μm in length, 288 μm in width; posterior plate of dorsal shield 385 μm in length, 325 μm in width; glandularia platelets as described and illustrated for the male; the pair of glandularia platelets flanking the middle of the body 76 μm in length; integumental and eye pigment absent; ventral shield 646 μm in length, 374 μm in width; genital field 207 μm in length, 136 μm in width; three pairs of genital acetabula, these somewhat narrowed near middle; distance between genital field and posterior end of body distinctly less than length of genital field (fig. 7); dorsal lengths of the palpal segments: P-I, 31 μm ; P-II, 100 μm ; P-III, 45 μm ; P-IV, 95 μm ; P-V, 62 μm ; tubercles on ventral side of P-IV of moderate length; fig. 3 shows the propor-

tions and chaetotaxy of the palp; capitulum 134 μm in length; dorsal lengths of the distal segments of the first leg: I-Leg-4, 97 μm ; I-Leg-5, 100 μm ; I-Leg-6, 104 μm ; fig. 4 illustrates I-Leg-5 and 6; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 117 μm ; IV-Leg-5, 138 μm ; IV-Leg-6, 109 μm ; seta at tip of IV-Leg-6, 114 μm in length; fig. 6 shows IV-Leg-6; swimming hairs absent.

Types. — Holotype male and allotype female (see introduction for locality data).

Discussion. — This is the second known species of *Neomamersa* bearing only three pairs of genital acetabula. The first, *N. triacetabulata*, was described by Cook (1980) from interstitial waters in Chiapas State, Mexico. The present species differs most noticeably in having comparatively much larger glandularia platelets flanking the dorsal shield, P-IV shorter than P-II, comparatively much shorter setal tubercles on P-IV, the anterior edge of the third coxae extending onto the anterolateral projections of the body proper and, in the male, the genital field is proportionally wider and the free sclerite bearing the second acetabula is approximately one half the width of a genital flap.

Subgenus Voldroguella subgenus nov.

Diagnosis. — Characters of the genus *Protolimnesia* as given by Cook (1974); capitulum without relatively long pointed posterior processes (fig. 9); palp with six small, seta-bearing tubercles on ventral side of P-IV; P-V very short and stocky, with two dorsal heavy setae evident (fig. 8).

Type species. — *Protolimnesia (Voldroguella) hispaniolae* sp. nov.

Discussion. — The initial impression, upon examining this species, is that it is very distinct from the typical subgenus of *Protolimnesia* but the differences are largely one of structure and proportions of the mouthparts. Members of *Proto-*

limnesia s. str. are presently known only from superficial waters of streams at high elevations in the southern Andes. Cook (1980) describes an additional subgenus of *Protolimnesia*, *Protolimnesella*, which occurs in interstitial waters from northern Argentina into southwestern United States. However, the present species is very distantly related to members of the latter subgenus and almost certainly is the end product of an independent invasion of the subsurface waters.

Protolimnesia (Voldroguella) hispaniolae
sp. nov. Figs. 8-12.

F e m a l e. — Length of body 790 μm ; integument soft and with honeycomb-like reticulations; these reticulations approximately 10 μm in greatest dimension and, when viewed laterally, are seen to be composed of numerous, needle-like integumental extensions approximately 4 μm in height; eyes and eye pigment completely absent; dorsum with a pair of posteromedial muscle attachment platelets, each 93 μm in length, 48 μm in width; length between anterior end of first coxae and posterior end of fourth coxae 532 μm ; anterior coxal groups separated medially, bearing many small setae and with relatively small posterior apodemes; posterior coxal groups with many short setae along anterior edge and Glandula *Limnesiae* located near anterior margin of third coxae; epimeroglandularia 1 free; genital field 219 μm in length, 155 μm in width; three pairs of genital acetabula, these occupying most of the area of the genital flaps; few setae present on the genital field; fig. 9 illustrates the venter; dorsal lengths of the palpal segments: P-I, 34 μm ; P-II, 233 μm ; P-III, 107 μm ; P-IV, 180 μm ; P-V, 28 μm ; P-II somewhat concave ventrally, with the ventral seta hair-like; the ventral side of P-IV with six small, seta-bearing tubercles, these arranged in two rows of three each; P-V comparatively short and stubby, with two prominent heavy setae dorsally; fig. 8 shows the proportions and chaetotaxy of the medial surface of the palp; capitulum 200 μm in length, 236 μm in width; chelicera very stocky (fig. 12) and 274 μm in length; dorsal lengths of the distal segments of the first leg: I-Leg-4,

155 μm ; I-Leg-5, 185 μm ; I-Leg-6, 192 μm ; fig. 10 illustrates I-Leg-5 and 6; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 232 μm ; IV-Leg-5, 303 μm ; IV-Leg-6, 303 μm ; claws present on fourth leg; fig. 11 shows IV-Leg-5 and 6; swimming hairs absent.

M a l e. — Unknown.

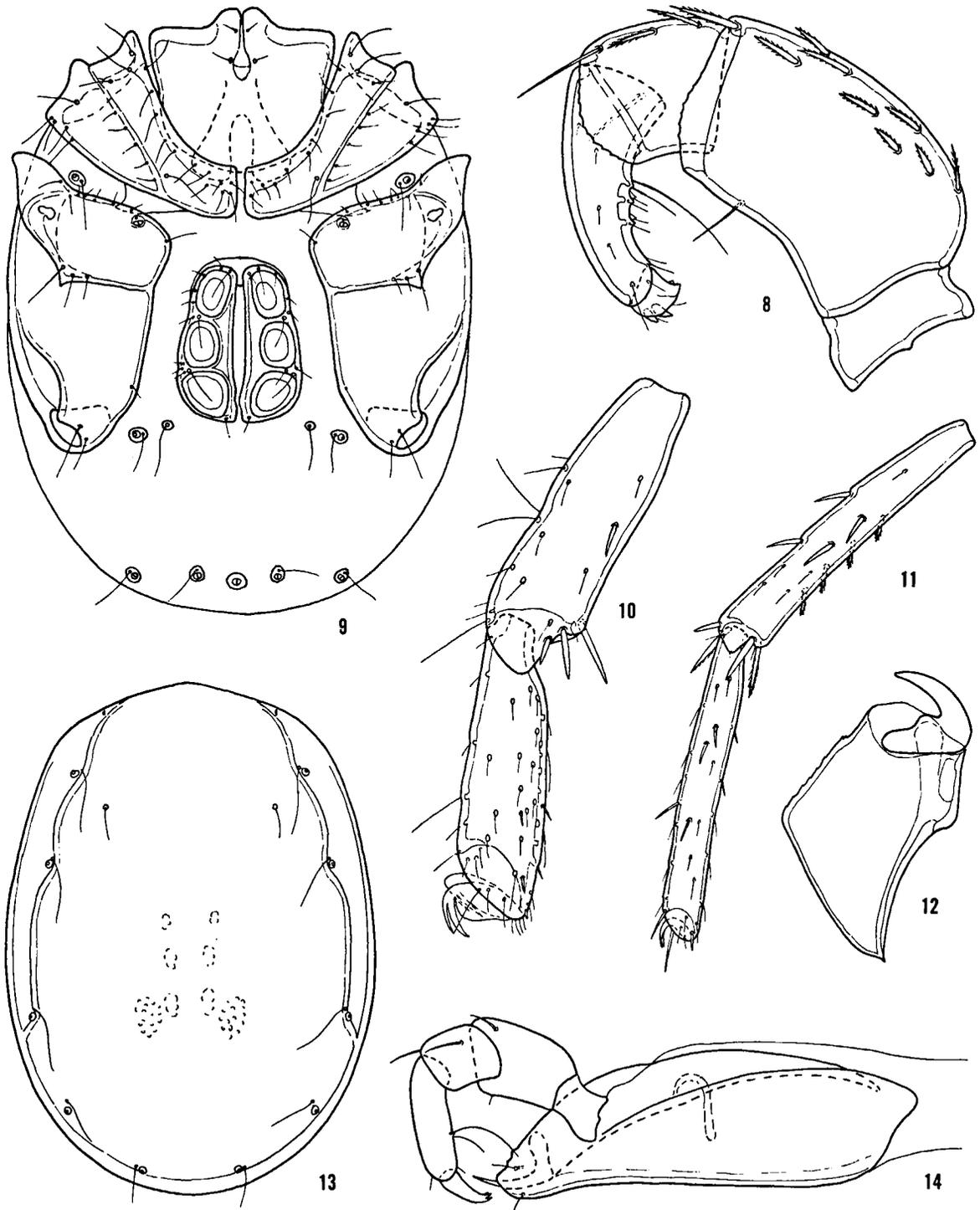
T y p e s. — Holotype female (see introduction for locality data).

D i s c u s s i o n. — The subgeneric description gives characters which will separate the present species from all other known members of the genus.

Genus *Mixdea* Orghidan & Gruia

This genus was described by Orghidan & Gruia (1980a) and based on specimens collected in interstitial waters associated with streams in Cuba. A new subfamily, *Mixdeinae*, was erected and placed in the *Mideidae*. However, its affinities appear to be with the *Limnesiidae* and does not seem to differ in any profound way from groups assigned to the subfamily *Protolimnesiinae*. Probably one of the characters leading to confusion over family placement is the lack of a seta on the ventral side of P-II, a structure which until recently was thought to be a characteristic of all *limnesiids*. Two related species are described in this paper and they have a small hair-like seta on P-II (figs. 17, 21) suggesting its absence in the Cuban species is a derived condition. Interestingly, in the genus *Tubophorella* K. O. Viets there is a similar reduction of the seta on the ventral side of P-II, it being hair-like in two of the three known species and absent in the other.

The two new species from Haiti are similar to the Cuban species (*M. composita*) except the mouthparts of the former are attached to a long tube of soft integument producing a greatly protrusible capitulum. It is convention to consider this type of difference to be of at least subgeneric value and the following new name is proposed.



Figs. 8-12. *Protolimnesia hispaniolae* sp. nov., ♀: 8, medial view of palp; 9, ventral view; 10, I-Leg-5 and 6; 11, IV-Leg-5 and 6; 12, chelicera.

Figs. 13-14. *Mixdea voldrogea* sp. nov.: 13, dorsal shield, ♀; 14, lateral view of capitulum and palp, ♂.

Subgenus **Tubomixdea** subgenus nov.

Diagnosis. — Characters of the genus *Mixdea* as given by Orghidan & Gruia (1980a) but with the capitulum narrowed and elongated, and attached to a long tube of protrusible integument; attachment scars of tube retractor muscles close together and tending to be in the posterior half of the dorsal shield (figs. 13, 25); lateral ridges present near periphery in anterior two-thirds of dorsal shield, these best seen in a newly metamorphosed specimen (fig. 13) but present on all specimens; glandularia present on dorsal shield.

Type species. — *Mixdea (Tubomixdea) botosaneanui* sp. nov.

Discussion. — The structure of the protrusible capitulum and its muscle anchorage on the dorsal shield is very similar to that found in *Tubophorella* K. O. Viets, as are the deep apodemes more or less paralleling the suture lines between the third and fourth coxae, and it is tempting to consider the latter a part of the same evolutionary line as *Mixdea*. Prominent differences are loss of claws on the fourth leg and posterior shifting of both the Glandula Limnesiae and postocularia in *Tubophorella*. These two changes would not be unexpected but *Mixdea* is multiacetabulate and *Tubophorella* is triacetabulate, a reversal of what is usually considered the direction of evolution in acetabula number within a group. Hopefully, further collecting in the northern neotropics will result in the taking of intermediate forms which will give a better indication of the phylogeny of this group of limnesiids.

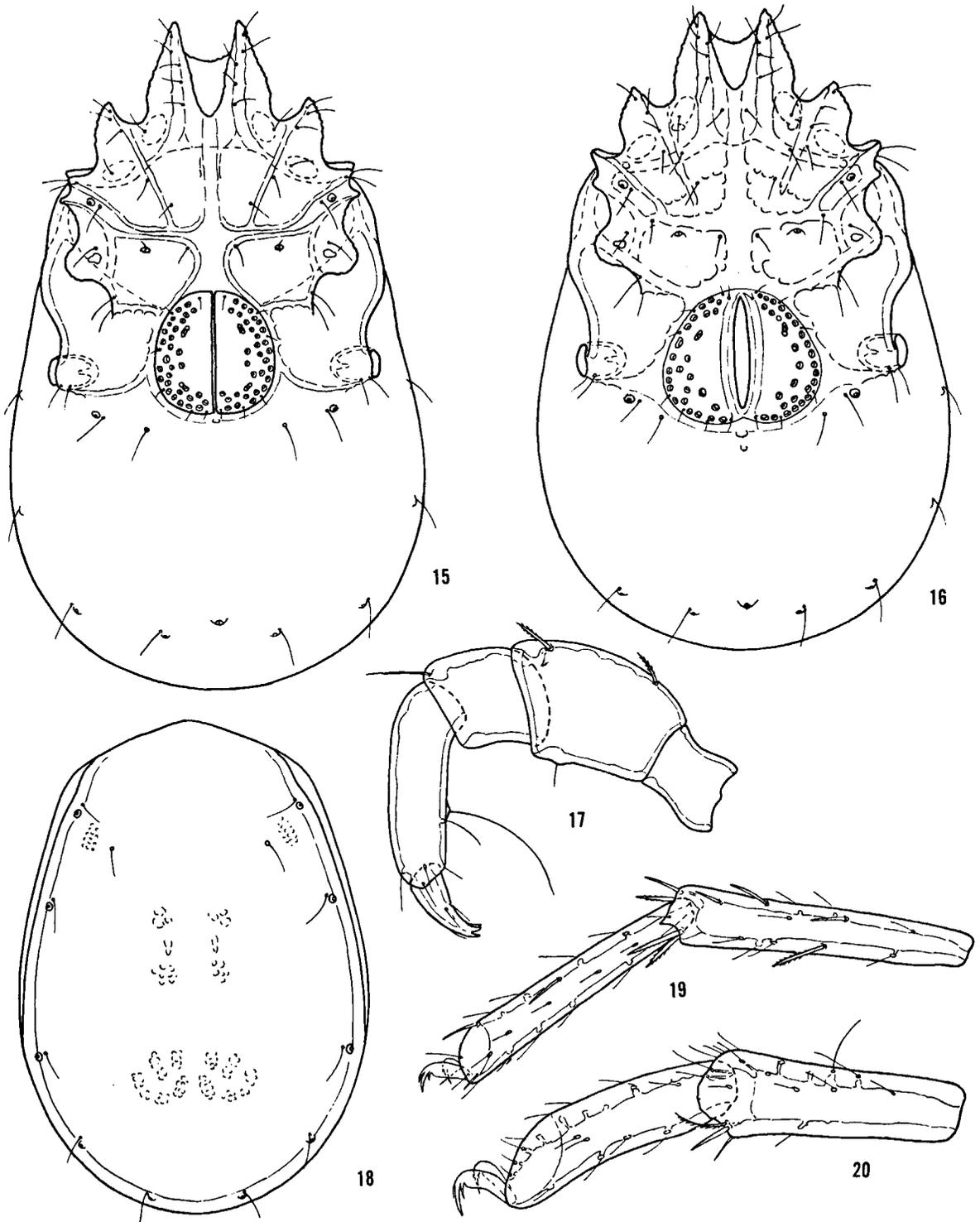
Mixdea (Tubomixdea) voldrogea sp. nov.

Figs. 13-20.

Male. — Dorsal and ventral shields present; dorsal shield 502 μm in length, 380 μm in width; dorsal shield with a pair of lateral ridges located very close to the lateral edges; five pairs of glandularia present and the postocularia located somewhat posteromedial to the first pair; attachment

scars of the capitular retractor muscles indicated in fig. 18; ventral shield 654 μm in length, 426 μm in width; a well developed camerostome present, this narrowly V-shaped ventrally; tips of first and second coxae projecting, second coxae well separated from each other medially; well developed anterolateral projections of body in region between second and third coxae; Glandula Limnesiae located near anterior edge of third coxae; well developed ridges extending anteriorly from insertion area of the fourth legs; genital field fused with the ventral shield, 145 μm in length, 170 μm in width; gonopore narrow but nearly as long as genital field; genital acetabula numerous; fig. 16 shows the ventral shield; dorsal lengths of the palpal segments: P-I, 20 μm ; P-II, 54 μm ; P-III, 36 μm ; P-IV, 57 μm ; P-V, 27 μm ; P-II with a short, hair-like ventral seta; fig. 17 illustrates a medial view of the palp; capitulum 189 μm in length and attached to a long tube of soft integument producing protrusible mouthparts; fig. 14 shows a lateral view of the capitulum and palp; dorsal lengths of the distal segments of the first leg: I-Leg-4, 86 μm ; I-Leg-5, 96 μm ; I-Leg-6, 101 μm ; fig. 20 shows the proportions and chaetotaxy of I-Leg-5 and 6; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 117 μm ; IV-Leg-5, 140 μm ; IV-Leg-6, 133 μm ; well developed claws present at tip of the fourth leg (fig. 19); swimming hairs absent.

Female. — Dorsal and ventral shields present; dorsal shield 532 μm in length, 426 μm in width; dorsal shield as described for the male, but lateral ridges better indicated in this newly metamorphosed female (fig. 13); ventral shield 729 μm in length, 471 μm in width; morphology of venter, other than genital field, similar to that described for the male; genital field 135 μm in length, 133 μm in width; movable genital flaps present, these bearing numerous genital acetabula (fig. 15); dorsal lengths of the palpal segments: P-I, 22 μm ; P-II, 60 μm ; P-III, 39 μm ; P-IV, 64 μm ; P-V, 27 μm ; capitulum 214 μm in length; dorsal lengths of the distal segments of the first leg: I-Leg-4, 89 μm ; I-Leg-5, 104 μm ; I-Leg-6, 107 μm ; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 131 μm ; IV-Leg-5,



Figs. 15-20. *Mixdea voldrogea* sp. nov.: 15, ventral shield, ♀; 16, ventral shield, ♂; 17, medial view of palp, ♂; 18, dorsal shield, ♂; 19, IV-Leg-5 and 6, ♂; 20, I-Leg-5 and 6, ♂.

149 μm ; IV-Leg-6, 142 μm ; structure of palp, capitulum and legs as illustrated and described for the male.

T y p e s. — Holotype male and allotype female (see introduction for locality data).

D i s c u s s i o n. — In addition to the subgeneric characters given earlier, both Haitian species differ from the Cuban species *M. composita* in bearing many more genital acetabula (approximately nine pairs in the latter, usually 20 or more in the former). See discussion under the following species for differences between the two Haitian forms.

Mixdea (Tubomixdea) botosaneanui sp. nov.

Figs. 21-27.

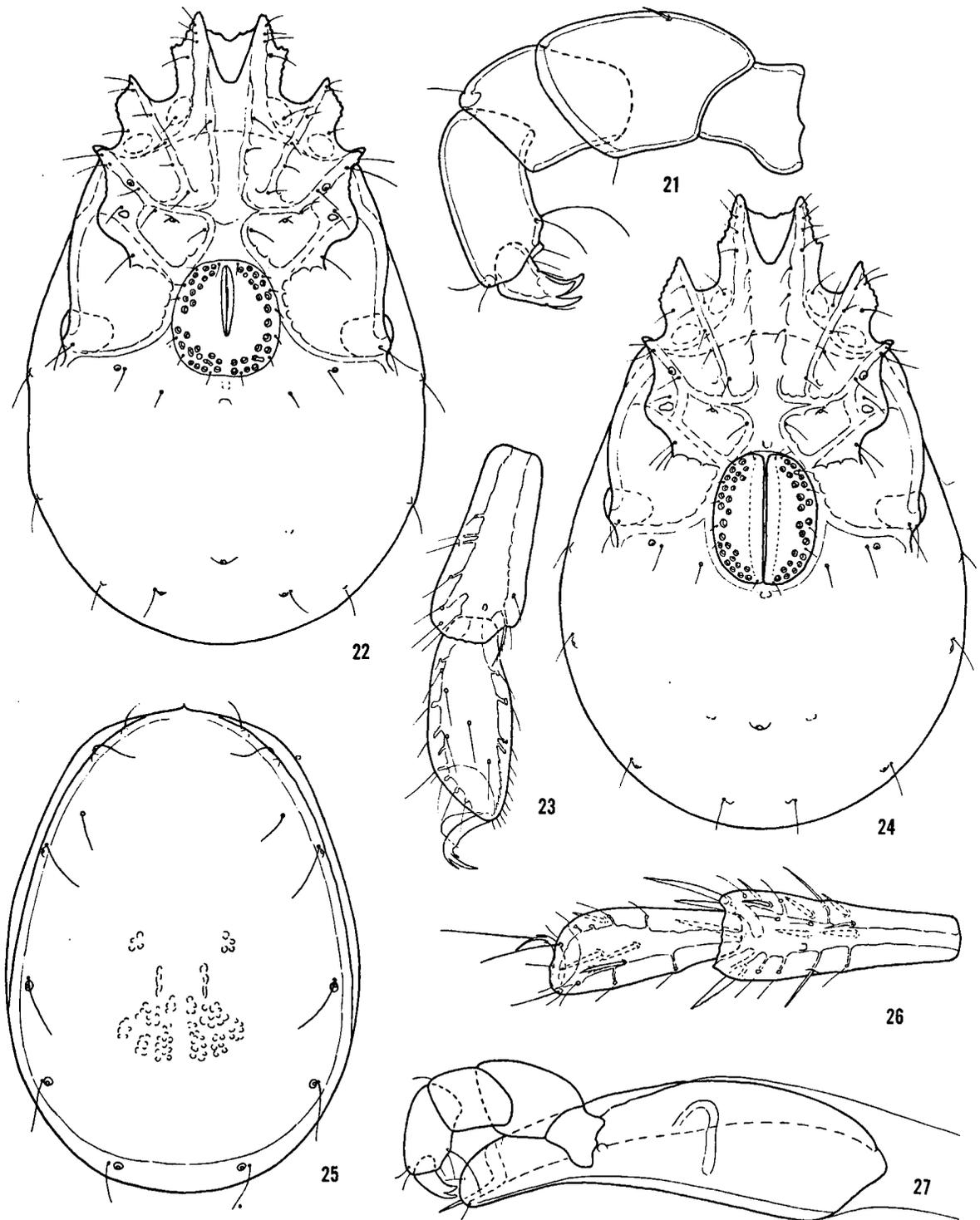
M a l e. — Dorsal and ventral shields present; dorsal shield 577 μm (563-608 μm) in length, 456 μm (448-456 μm) in width; dorsal shield with a pair of lateral ridges located very close to the lateral edges in anterior two-thirds of body; six pairs of glandularia present on the dorsal shield (anterior two pairs on side of lateral ridges and difficult to see); postocularia located well posterior and lateral to the second pair of glandularia; attachment scars of capitular retractor muscles well posterior in position (fig. 25); ventral shield 754 μm (737-775 μm) in length, 502 μm (501-506 μm) in width; a well developed camerostome present, this V-shaped ventrally; first and second coxae projecting, second coxae well separated from each other medially; antero-lateral portion of third coxae ending on well developed anterolateral projections of the body proper; Glandula Limnesiae located near anterior edge of third coxae; well developed ridges extending anteriorly from region of insertion of the fourth legs; genital field fused with the ventral shield, 134 μm (134-148 μm) in length, 121 μm (118-126 μm) in width; gonopore narrow and confined to the anterior two-thirds of the genital field; genital acetabula numerous; fig. 22 shows the structure of the ventral shield; dorsal lengths of the palpal segments: P-I, 14 μm (14-17 μm);

P-II, 53 μm (52-57 μm); P-III, 25 μm (26-28 μm); P-IV, 45 μm (44-50 μm); P-V, 22 μm (21-24 μm); P-II with a short, hair-like ventral seta; fig. 21 shows a medial view of the palp; capitulum 200 μm (200-218 μm) in length and attached to a long tube of soft integument; fig. 27 shows a lateral view of the capitulum and palp; dorsal lengths of the distal segments of the first leg: I-Leg-4, 107 μm (104-107 μm); I-Leg-5, 118 μm (117-125 μm); I-Leg-6, 128 μm (128-141 μm); fig. 23 illustrates I-Leg-5 and 6; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 128 μm (128-138 μm); IV-Leg-5, 152 μm (152-173 μm); IV-Leg-6, 135 μm (138-145 μm); well developed claws present on IV-Leg-6 (fig. 26); all leg appendages stocky; swimming hairs absent.

F e m a l e. — Dorsal and ventral shields present; dorsal shield 616 μm (653 μm) in length, 471 μm (502 μm) in width; dorsal shield as described for male; ventral shield 775 μm (829 μm) in length, 517 μm (562 μm) in width; morphology of ventral shield, other than genital field region, as described for male; genital field 156 μm (169 μm) in length, 124 μm (131 μm) in width; movable genital flaps present, these bearing numerous genital acetabula (fig. 24); dorsal lengths of the palpal segments: P-I, 15 μm ; P-II, 54 μm ; P-III, 26 μm ; P-IV, 46 μm ; P-V, 24 μm ; capitulum 232 μm in length; dorsal lengths of the distal segments of the first leg: I-Leg-4, 104 μm (109 μm); I-Leg-5, 121 μm (128 μm); I-Leg-6, 131 μm (135 μm); dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 137 μm (142 μm); IV-Leg-5, 162 μm (176 μm); IV-Leg-6, 135 μm (148 μm); structure of palp, capitulum and legs as described and illustrated for the male.

T y p e s. — Holotype male, allotype female, three paratype males and one paratype female (see introduction for locality data).

D i s c u s s i o n. — The present species differs in a number of characteristics from *M. voldroguera*, the most noticeable of which are the proportionally much stockier appendages, six pairs of glandularia on the dorsal shield (most anterior pair in this



Figs. 21-27. *Mixdea botosaneanui* sp. nov.: 21, medial view of palp, ♂; 22, ventral shield, ♂; 23, I-Leg-5 and 6, ♂; 24, ventral shield, ♀; 25, dorsal shield, ♂; 26, IV-leg-5 and 6, ♂; 27, lateral view of capitulum and palp, ♂.

species shifted to anterodorsal portion of the ventral shield in *M. voldroguera*) and the proportional differences in the male genital field (compare figs. 16 & 22).

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