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PSEUDOERIOPSYLLA BITOMI SP. N. (HEMIPTERA: HOMOTOMIDAE), A NEW PEST OF FICUS PLATYPHYLLA (MORACEAE) FROM THE WESTERN REGION OF CAMEROON

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ABSTRACT

A new *Pseudoeriopsylla* species is described from the Western Region of Cameroon, *Pseudoeriopsylla bitomi* sp.n.. The described species of *Pseudoeriopsylla* genus are exclusively African and are characterised by the presence of a pterostygma and the absence of the costal break on the forewing. The investigations carried out since 2005 in the Western Region of Cameroon have permitted the collecting of this new species. Previously, *Pseudoeriopsylla laingi* and *Pseudoeriopsylla etoundii* were described from Cameroon. The new species is diagnosed and illustrated; information is given on its distribution, host plant and biology. The species is a pest of *Ficus platyphylla* in Fongo-Tongo Sub Division. It feeds on the leaves and young buds of *Ficus platyphylla*

Keywords: biodiversity, taxonomy, pest, host plant, Macrohomotominae, Cameroon

1. INTRODUCTION

Jumping plant-lice or psylloids form a moderate-sized group of Hemiptera Sternorrhyncha. They can be harmful to their hosts in removing large quantities of plant sap, and in producing honeydew which soils leaves and fruits, and attracts sooty moulds, or by transmitting diseases [1]. Recent investigations on psyllid biodiversity and their host plants in Cameroon reported more than 35 species of Triozidae associated with 12 different plant families [2], 10 species of Phacopteronidae feed on 6 host plants,[3]-[4]. Thirty-seven species of Psyllidae on 16 host plants were recorded in the Western Region of Cameroon, [5], 45 species of Psyllidae on 34 host plants in the Centre Region of Cameroon, [6], 35 species of Psyllidae on 29 host plants in the South Region of Cameroon, [7]. Homotomidae family is characterised by a pair of tubercles present on the metapostnotum; ventral sense organs of metafemur in basal position, proximal organ offset from distal pair; male proctiger bipartite (not Synoza); male subgenital plate without laterodorsal appendages; rs-m crossvein absent on forewing. This family has three subfamilies: Dynopsyllinae with 5 genera (*Diceraopsylla*, *Dynopsylla*, *Austrodynopylla*, *Triozamia* and *Afrodynopsylla*); Homotominae with 2 genera (*Homotoma*, *Synoza*); Macrohomotominae with 4

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genera (*Mycopsylla*, *Macrohomotoma*, *Phytolyma* and *Pseudoeriopsylla*),[8]. In Cameroon, *Homotoma* genus has 8 known species; *Triozamia lamborni* Newstead; *Phytolyma* genus has 2 species (*Phytolyma fusca* Hollis and *Phytolyma tchuentei* Tamesse *et al*.); *Pseudoeriopsylla* genus has 2 species (*Pseudoeriopsylla laingi* Hollis & Broomfield, and *Pseudoeriopsylla etoundii* Dzokou *et al*.). African fauna of *Pseudoeriopsylla* genus counts 7 species: *Pseudoeriopsylla nyasae* Newstead; *P. medleri*, *P. carvalhoi*, *P. kenyae*, *P. etiennei* and *P. laingi* (Hollis & Broomfield); *Pseudoeriopsylla etoundii* (Dzokou *et al*.).These species are Ficus-feeding psyllids. *Pseudoeriopsylla bitomi* sp.n. host plant is *Ficus platyphylla* (Moraceae). The leaves of *Ficus* spp. are used in several regions in the North of Ivory Cost to cure rheumatism, [9].

2. MATERIALS AND METHODS

The psyllids were captured on *Ficus platyphylla* (Moraceae) at Fongo-Tongo Sub Division, Menoua Division, in the West Region of Cameroon. Adults were captured with the help of an entomological net of 0.5 mm mesh size and with the help of a mouth aspirator or soft hair brush. Larvae were sampled using a mouth aspirator. The material is mounted on slides in Canada balsam and conserved in 70% ethanol in the Laboratory of Zoology of the University of Yaoundé I (LZUY) and in Laboratory of Agricultural Zoology of the University of Dschang (LAZUDs). It is deposited in the Museum of Natural History of Basle (NHMB) in Switzerland and in the Royal Museum for Central Africa (RMCA) in Belgium. The morphological terminology follows [8]. The illustrations were achieved under a microscope LEICA DM. 1000 with a drawing tube. Measurements (mm) were made from specimens preserved in 70% ethanol. The host plant was identified at the National Herbarium of Yaoundé (Cameroon) and is deposited in LZUY. Material examined: Holotype : ♂, Cameroon :West Region, Fongo-Tongo, 10°04'N, 5°26'E, 1385 m, 18 August 2006, *Ficus platyphylla* (V.J. Dzokou & J.L.Tamesse). Slides mounted (LZUY). Paratypes: Cameroon: 4 ♂, 6 ♀, 13 larvae, same data as holotype; 2 ♂, 2 ♀, 5 larvae, dry and slide mounted or preserved in 70% ethanol (NHMB); 1 ♂, 1 ♀, 1 larva, preserved in 70% ethanol (RMCA); 3 ♂, 3 ♀, 5 larvae, same data as holotype, 04 November 2014 (V.J. Dzokou), preserved in 70% ethanol in the Laboratory of Agricultural Zoology, University of Dschang (LAZUDs).

3. RESULTS

Taxonomy *Pseudoeriopsylla* Newstead *Pseudoeriopsylla* [11];

Yang & Li, 1984b: p 370 (as a synonym of

Macrohomotoma); [12].

Type species: *Pseudoeriopsylla nyasae* Newstead, by monotypy.

Pseudoeriopsylla Newstead; [13] (as a synonym of *Macrohomotoma*) [Misspelling.]

Pseudoeriopsylla Newstead; [8].

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Key of *Pseudoeriopsylla* from Cameroon

1-Fore wing with a pterostigma partially sub-rounded or entirely mottled…….2

-Fore wing with a very lengthened pterostigma and entirely sinks…….5

2-Opaque band along the cubital vein Cu1 and Cu1b of the fore wing.....…...3

3-Presence of a dark spot in the cell Cu2……*Pseudoeriopsylla laingi*

4-Absence of opaque band along the cubital vein Cu1 and opaque spot only at the apex of the Cu1b……...……*Pseudoeriopsylla etoundii*

5-Basal portion of the fore wing entirely mottled, cell cu2 sinks, except in its central part with a clear triangular area, presence of an apical rhinarium on flagellomere 1 and 2 rhinaria on flagellomere 2…….*Pseudoeriopsylla bitomi sp.n.*

Description

Adult. (Fig. 3) Colouration: overall body of ♂ is darkish and females is clear. Tergites and sternites alternate the dark and the clear segments; 8th, 7th and the apical end of 6th flagellomeres of the antenna are more dark; a dark band covers the basal part of the fore wing spreads out of M+Cu1, follows Cu1b stem and reaches to the anal margin; this band isolates the intermediate clear zone roughly triangular from the dark zone to the basal part of the wing; hind wing presents a slightly pigmented area between C+Sc and R+M+Cu1 above the Cu2 stem. Structure: head (Fig. 1a) approximately semi-circular; compound eyes found at the base of the genae, genal cones are absent. Dorsally, median epicranian suture well defined, divide the vertex into two blocks; vertex with short setae. Antennae cavities widened. Median ocellus, locates on middle line of the vertex; lateral ocelli at the base of the vertex, very close to the limit with the pronotum. Metapostnotum with a dorsal process in the form of three spines; mesopraescutum, mesoscutum and tegula rounded. In profile view, 4 stigmas orifices visible at the limit sternite-tergite. Antenna (Fig. 1b) with a scape larger than pedicel; pedicel bears some setae. The first flagellomere, is the longest and carries a rhinarium at its apical end; 2nd, 3rd, 4th, 5th and 6th flagellomeres with the same length approximately. 2nd and 4th flagellomeres with 2 apical rhinaria; 6th flagellomere widened apically; 7th flagellomere is triangular with apical portion wide than proximal portion which is narrow; 8th flagellomere is the widest flagellomere of the flagellum with two long setae; All the antennal segments are sparse with setae except the scape. Forewing (Fig. 1c) is triangular with elongate pterostigma. C+Sc vein bears a basal short seta. R+M+Cu1 is robust and short; M+Cu1 stem longer than R+M+Cu1 stem; R vein is two times longer than R+M+Cu1 stem, R1 vein is very short because of pterostigma; Rs vein exceeds the length of the pterostigma; the large size of the pterostigma decreases r1 cell surface; Cu1 vein is very short; Cu1a vein parallel to M vein partially; Cu1b vein joins the anal vein just towards the anal break. M vein is less longer than Rs vein; M1+2 vein arched towards r2 cell and slightly longer than M3+4 vein; this M1+2 vein joins the anal not far from the apex of the wing, making

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r2 cell to be longer than the other cells; m1, m2 and cu1 cells with a radular area; Anal vein with several cells after the costal break. Claval suture clearly defined. Hind wing (Fig. 1d) with no rectilinear and discontinuous Cu2 stem; anal stem differentiated towards its basal part with a slight gap at the junction with Cu2 stem; R+M+Cu1 stem differentiated into R and M+Cu1 stems; the other branches of the wing are not well defined. C+Sc vein with several spines raised up towards the outside at its bases on both sides of the costal break and 4 spines directed towards the inner part, shortly after the break here give only how many setae the wing has before the costal break and how many groups of setae after costal break. Hind leg (Fig. 1e) with a coxa bearing a well-developed meracanthus; metafemur with a poor pilosity where the setae are grouped into 3, 9 and 2; metatibia with a crown of short setae in its apical part, and ended with 4 spurs. Metabasitarsus with two spurs. ♂genitalia (Fig. 1f) has a proctiger composed of two segments; basal segment, more developed, and its internal margin is expanded bearing 7 setae; apical segment is cylindrical arched in the internal margin and incurved on external margin, with a truncated apex and several setae. An intermediate segment having more widened base between the proctiger and the ♂ subgenital plate. Paramere (Fig. 1g) is flattened at the basal part and rounded apex, the subproximal external margin is slightly incurved; 2/3 of the paramere is covered with simple setae. Apical segment of aedeagus (Fig. 1h) is thick with rounded apex, the subapical internal margin slightly incurved.

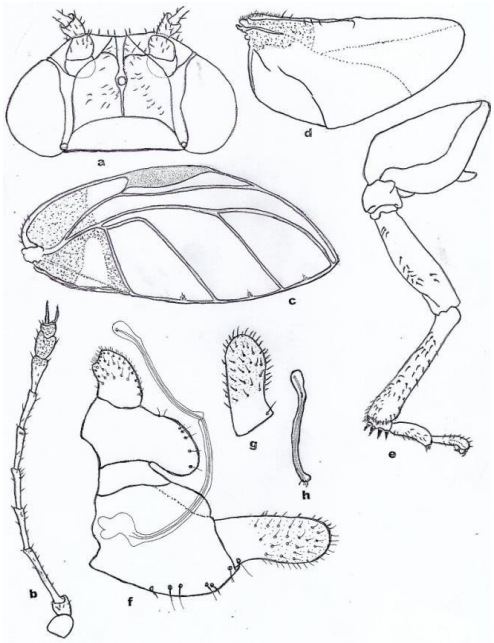

Figure 1: *Pseudoeriopsylla bitomi* sp.n., a: head, dorsal view; b: antenna; c: fore wing; d: hing wing; e: hing leg, in profile; f: ♂ terminalia, in profile; g: paramere, in profile; h: distal segment of aedeagus, in profile. Scales bars: a, e, f, g, h= 1.6 mm; b= 0.8 mm; c, d= 4 mm.

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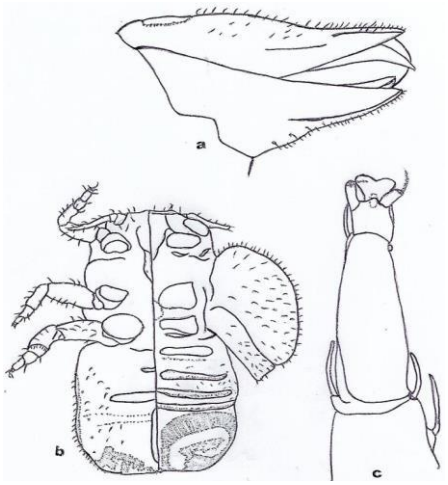

Figure 2: *Pseudoeriopsylla bitomi* sp.n., a: ♀ terminalia, in profile; b: fifth instar larva, left dorsal and right ventral surfaces; c: fifth instar larva, tibiotarsus apex. Scales bars: a= 1.6 mm; b= 4 mm; c= 0.4 mm.

Male genitalia (Fig. 2a) has an inner valve longer than the dorsal and ventral valves; ventral valve shorter than dorsal valve. ♀ proctiger has narrow apical part with pointed apex; the circumanal is cylindrical and composed of a single row of rounded pores and bears setae dorsally. Subgenital plate is shorter than proctiger ended by pointed apex and also bears setae. Measurements and ratios in Tables I and II.

Figure 3: *Pseudoeriopsylla bitomi* sp.n. ♂

Fifth instar larva (Figs. 2 b-c) and Fig. 4. Colouration: the overall body of fifth instar larva is green with dark margins. Structure: body (Fig. 2b) is divided into head, thorax and abdomen. Antenna with 3 segments carrying short silks; flagellum is not segmented. Wing pads bear short setae dorsally on their entire surface; fore wing pad are three times larger than that of the hind wing pad; 4 dorsal sclerites well defined and the last, delimited by the caudal plate. Caudal plate occupied a great surface dorsally, and only a small portion ventrally. Abdomen is flattened basally and sparse of setae; there are 7 stigma orifices visible along the abdomen; the first two orifices closer to the thorax touching the margin of the abdomen. The distal part of the abdomen has a truncate apex; the circumanal is complex with several rows of pores. Hind leg is composed

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of 6 segments, arolium of metatibiotarsus (Fig. 2c) between the claw pads is bilobed and carrying an excrescence. Measurements and ratio in Table III.

Figure 4: *Pseudoeriopsylla bitomi* sp.n. larva (dorsal)

Table III: Measurements (in mm) of fifth instar larva of *Pseudoeriopsylla bitomi* sp.n.

Measured Parameters	*P. bitomi* sp. n. (N=26)
Body length	3.7-4.69
Body width	3.8-4.5
Antenna length	0.62-1.12
Fore wing-pad length	2.25-2.62
Caudal plate length	0.8-1.5
Caudal plate width	2.37-2.81

Host plant: *Ficus platyphylla* (Moraceae). **Biology**: the adults and larvae feed on the lower face of the leaves; youngest larvae between the buds larvae produce white wax. The buds where the larvae are located desiccate shortly after the last moult of the insects.

Distribution: Western Region of Cameroon.

Etymology: the species is dedicated to Professor Dieudonné Lucien BITOM OYONO, Soil Scientist and Dean of the Faculty of Agronomy and Agricultural Sciences for his interested on this research.

4. DISCUSSION

The *Pseudoeriopsylla* genus is originated from Africa. Three species living on *Ficus* genus (Moraceae) are exclusively known in the highlands of Western-Cameroon. The new species of *Pseudoeripsylla* from Western-Cameroon described in this work is compared with the african species described previously in the same genus.

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Table I: Measuments (in mm) of adult *Pseudoeriopsylla bitomi* sp.n. (N= number of measured specimens)

Measured parameters	*Pseudoeriopsyllabitomi* sp. n.	
	♂(N=5)	♀(N=6)
Body length	7.12-8.19	7-8.06
Body width	2-2.37	2-2.62
Head width	1.5-1.75	1.5-1.75
Antenna length	2.12-2.62	1.75-1.87
Flagellomere 1 length	0.37-0.5	0.37-0.44
Fore wing length	8.62-9.37	9-10
Fore wing width	3.37-3.81	3.87-4.12
Hind wing length	3.12-4.12	4-5
Hind wing width	1.19-1.87	2
Length of distal segment of aedeagus	0.5-0.62	
Paramere length	0.37-0.62	
♂ proctiger length	0.37-0.56	
Metafemur length	0.87-1.25	1.12-1.25
Metatibia length	1.25	1.12-1.25
♀proctiger length		1.94-2.37
♀subgenital plate length		1.15-1.62
Pterostigma length	2.12-2.25	2.19-2.62
Vein Rslengh	3.56-3.87	4-5
Length margin of cells r_2, m_1 and m_2	3.12-3.31	3.3-3.5
Vein M_{1+2} length	3.12-3.87	3.5-3.7
Vein M_{3+4} length	2.5-2.94	2.94-3.12
Length margin of cell m1	1.37-1.81	1.62-1.81
Length margin of cell cu1	2.1-2.5	2.37-2.75
cu_1 cell width	1.94-2.37	2.37

Table II: Ratios (in mm) of adult *Pseudoeriopsylla bitomi* sp.n.

Measured parameters	*P. bitomi* sp. n.	
	♂(N=5)	♀(N=6)
Fore wing length / fore wing width	2.46-2.56	2.32-2.43
Fore wing length / paramere length	2.27-2.76	2-2.25
Paramere length / hind wing width	2. 2-2.62	2-2.5
Antenna length / flagellomere 1 length	5.24-5.73	4.25-4.73
♂ proctiger length / head width	0.25-0.32	-
Metatibia length / head width	0.71-0.83	0.71-0.75
Antenna length / head width	1.41-1.49	1.07-1.17
Flagellomere 1 length / head width	0.25-0.28	0.25
♀ proctiger length / ♀ subgenital plate length	-	1.29-1.46

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Pseudoeriopsylla nyasae is known in Malawi and Mozambique feeding on *Ficus thonningii*; *Pseudoeriopsylla laingi* from Angola, Kenya, Uganda, Nigeria, Sierra Leone, Guinea and Senegal feeding on *Ficus thonningii* and *Ficus natalensis*, [8]. In Cameroon, a male of *Pseudoeriopsylla laingi* was collected with yellow trap in 1957 by Eastop at Bamenda (North-West), [8]; *Pseudoeriopsylla etoundii* [10] collected on *Ficus leprieuri* in the West- Region. *Pseudoeriopsylla meddleri* is known in Nigeria and *Pseudoeriopsylla carvalhoi* in Angola, Republic Democratic of Congo and Nigeria, this psyllid feeds on *Ficus ovata*, but the larvae remain unknown. *Pseudoeriopsylla kenyae* was collected in Kenya and *Pseudoeriopsylla etiennei* in Senegal on *Ficus* spp., [8]. The structure of the pterostigma of *Pseudoeriopsylla bitomi* sp.n. which is elongate differs from that of all *Pseudoeriopsylla* species described previously and cited above where the pterostigma is rounded or slightly oval. This structure of pterostigma is similar to that of *Mycopsylla* genus (*M. gardenensis*, *M. Oblique* and *M. propinqua*) and that of the subfamily Dynopsyllinae (*Diceraopsylla brunettii*, *Dynopsylla pinnativena*, *Austrodynopsylla encala*, *Afrodynopsylla gigantean*). But, the pterostigma of these species is not dark as *P. bitomi* sp. n., [8]. In *Pseudoeriopsylla bitomi* sp.n., a dark band covers the basal part of the fore wing spreads out of M+Cu1, follows Cu1b stem and touches the anal margin. This dark band isolates the intermediate clear zone roughly triangular from the dark zone to the basal part of the wing. In *Pseudoeriopsylla etoundii*, a thickly pigmented area is located between the anal break and the Cu1b stem. In *P. laingi*, ¼ of anal and Cu1b stems plus Cu1a stem bear each one a dark band. A small isolated dark area on cu2 cell is observed in *P. bitomi* sp. n. while in *P. etiennei* there is no dark area on the wing cells. The genal cones form a V letter like structure in *P. laingi* and the median ocellus is located at the basis of these genal cones while in *Pseudoeriopsylla bitomi* sp. n., the genal cones are lacking and the median ocellus is almost in the centre of the head, same organization in *P. etoundii*. Concerning the number of rhinaria on the first and second flagellomeres, in *P. nyasae*, 1st and 2nd flagellomeres bear 3 and 4 rhinaria respectively; in *P. laingi*, 1st flagellomere bears approximately 19 rhinaria and 2nd two apical rhinaria; in *P. medleri*, 1st flagellomere bears approximately 40 rhinaria, 2nd approximately 6; in *P. carvalhoi*, 1st and 2ndflagellomeres bear many rhinaria; in *P. kenyae*, *P. etiennei* and *P. etoundii*, 1st and 2nd flagellomeres each bears a single rhinarium while in *Pseudoeriopsylla bitomi* sp. n., 1st flagellomere bears a single rhinarium, 2nd flagellomere two rhinaria. The structure of the paramere and the existence of only one seta on its basal portion, in *Pseudoeriopsylla bitomi* sp. n. is specific and characteristic of this species. The paramere of the other species is sparse of setae with variable density. In *Pseudoeriopsylla bitomi* sp. n., the apical segment of aedeagus carries a small dorsal depression and a rounded apex while in *P. etoundii*, it is rounded without depression and in *P. laingi*, 2 dorsal depressions, one ventral and one summital depressions. The structure of caudal plates of 5th instar larvae is very different from all the known species.

5. CONCLUSION

Pseudoeriopsylla bitomi sp.n. is described for the first time. The biometric and morphological data show that the species is a new for the Science. This work increases the number of described

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species of *Pseudoeriopsylla* genus from seven to eight and brings up to three the described species in Cameroon.

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