

Three New Species of *Pseudoeriosylla* (Hemiptera-Psyloidea-Homotomidae) Associated with *Ficus* spp. (Moraceae) from Western Cameroon

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Abstract: Without the continuous investigation on biodiversity, many species would be at risk of disappearing without ever being known and described. The local fauna inventory should constitute an important basis to reach the objectives defined in the Convention on Biological Diversity. This convention adopted during the summit of Rio de Janeiro in 1992, recommends the conservation and the sustained use of the biodiversity. This requires inventories of species described and the taxonomic of unknown species. In the case of insects, only a little proportion of existing species is described. Thus, during our investigations, 3 species of the genus *Pseudoeriosylla* were collected and morphometric studies showed that they were unknown by science. The three new *Pseudoeriosylla* species are named: *Pseudoeriosylla fouboti* sp. n., psyllid of *Ficus* cf. *ovata*; *Pseudoeriosylla dschangi* sp. n., psyllid of *Ficus thonningii*; *Pseudoeriosylla njonfangi* sp. n., psyllid of *Ficus preussii*. Previously *P. laingi*, *P. etoundii*, *P. bitomi* and *P. mpoamei* were described and named from Cameroon. The three new species feed on the leaves and young buds of their host plants, except *Pseudoeriosylla dschangi* sp. n. which is feeding only on the roots of *Ficus thonningii*. The species are diagnosed and illustrated, the dichotomous key for adults' identification is provided. Larvae of these species produced wax on their anal pore which covers the attacked organs of their host plants.

Keywords: Taxonomy, *Pseudoeriosylla*, Psyllid Pest, Moraceae, Cameroon

1. Introduction

Psyllids are insect pests that bite plants and suck sap. They are jumping plant-lice varying in size from 1 mm to 10 mm in length for the largest. They live exclusively on dicotyledons [1, 2]. Few species attack monocotyledons and conifers [3]. They are generally very specific to their host plants [4]. However, Dzokou et al. [5] recorded several psyllid species from

different families on the same plant species (*Ficus vallis*) in the Western highlands of Cameroon. This shows that psyllid-host specificity is not strict. The damage caused by these pests on host plants varies, the most severe being attributed to the larval stages [6]. They can be harmful to their hosts in removing large quantities of plant sap, and in producing honey dew

which soils leaves and fruits, and attracts sooty moulds, or by transmitting diseases [7].

The psyllid fauna of Cameroon has 5 families (Carsidaridae, Phacopteronidae, Psyllidae, Triozidae and Homotomidae) [8]. The family Homotomidae includes 3 subfamilies (Dynopsyllinae, Homotominae and Macrohomotominae). Macrohomotominae includes two genera *Phytolyma* and *Pseudoeriopsylla*. The genus *Pseudoeriopsylla* is african and currently has 9 described species: *Pseudoeriopsylla carvalhoi*, *P. etiennei*, *P. kenyae*, *P. laingi*, *P. meldleri*, and *P. nyasae* [9] *P. etoundii* [10], *P. bitomi* [11], *P. mpoamei* [12]. The present work describes 3 other new species associated with the Moraceae in the Western highlands of Cameroon.

2. Materials and Methods

2.1. Collection Localities

Foumbot (latitude: 10°38'N, longitude: 5°31'E, altitude: 1105m); Dschang and Nkop (latitude: 10°04'N, longitude: 5°26'E, altitude: 1385 m).

Type series deposit: The specimens collected were deposited in the collection of the Laboratory of Zoology, Higher Teacher's Training College, University of Yaoundé I (LZUY), in the Naturhistorisches Museum Basel, Switzerland (NHMB), in the Royal Museum for Central Africa (RMCA) and in the Laboratory of Agricultural Zoology of the University of Dschang (LAZUDs).

2.2. Field Survey

The observations and survey took place in tree localities of Western-Cameroon listed above from January, 2006 to December, 2018. During the field survey, the host plants

Key to *Pseudoeriopsylla* from Cameroon

- 1- Forewing with a pterostigma partially sub-rounded or entirely mottled.....3
- 2- Forewing with a pterostigma lengthened entirely mottled.....8
- 3- Opaque band along the cubital vein Cu₁ and Cu_{1b} of the forewing.....4
- 4- Absence of opaque band along the cubital vein Cu₁ and opaque spot only at the apex of the Cu_{1b}
- Pseudoeriopsylla etoundii* Dzokou *et al.*
- 5- Presence of a dark spot in the cell Cu₂ *Pseudoeriopsylla laingi* Hollis & Broomfield
- Presence of a dark spot in the base of the anal cell.....*Pseudoeriopsylla dschangii* sp.n.
- 6- Absence of dark spot at the base of the anal cell.....7
- 7- Presence of many rhinaria on first flagellomere and 2 apical rhinaria on second flagellomere.....
- Pseudoeriopsylla njonfangi* sp.n.
- Presence of many rhinaria on first flagellomere and more than 2 rhinaria on second flagellomere
- Pseudoeriopsylla mpoamei* Dzokou *et al.*
- Presence of an apical rhinarium on the 1st flagellomere and 2nd flagellomere without rhinarium *Pseudoeriopsylla foumboti* sp.n.
- 8- Presence of an apical rhinarium on the 1st flagellomere and 2 rhinaria on 2nd flagellomere, basal portion of the forewing entirely mottled *Pseudoeriopsylla bitomi* Dzokou *et al.*

3.1.1. *Pseudoeriopsylla Foumboti* sp.n.

[Figure 1, Figure 4 (A₁, B₁, C₁), Figure 5 (D₁, E₁, F₁, G₁, H₁), Figure 6 (I₁, J₁)].

Description

were inspected; adult psyllids were captured with a sweep net of 0.5 mm mesh size and mouth aspirator. Larvae were sampled directly from buds and leaves of the host plants. The unknown host plants were collected and were identified at National Herbarium of Yaoundé (NHY). These identified host plants were deposited in LZUY.

2.3. Observations and Illustrations

The specimens are preserved dry and slide-mounted or in 70% ethanol and are deposited in LZUY, NHMB, RMCA and LAZUDs. Morphology of each species was illustrated using transmission Leica Microscope and measurements were made from slide-mounted using Leica Stereomicroscope.

2.4. Terminologies

Morphological terminology used to describe the different species of *Pseudoeriopsylla* derives from Hollis and Broomfield [9]; Ossiannilsson [13].

3. Results and Discussion

3.1. Taxonomy

Pseudoeriopsylla Newstead

Pseudoeriopsylla Newstead, [14]: p 105; Yang & Li, [15]: p 370 (as a synonym of *Macrohomotoma*); White & Hodkinson, [16]: p 242. Type species: *Pseudoeriopsylla nyasae* Newstead, by monotypy.

Pseudoeriopsylla Newstead; Crawford, [17]: p 62 (as a synonym of *Macrohomotoma*). [Misspelling].

Pseudoeriopsylla Newstead; Hollis & Broomfield, [9]: p 153, 154.

Adult

Colouration: Males overall body blackish and females yellowish. Pronotum dark dorsally, mesopraescutum and mesoscutum features ornamented in the length direction of the body; axillae of meso-scutellum dark. Metapostnotum

flattened with dark tergites except the last 3 segments before the male terminalia; in female, sternites are flattened and tergites blackish. The 7th, 8th as well as the apical portion the 6th flagellomeres are dark. R and C+Sc items of the forewing delimit a dark area (Figure 1A, 1B).

Morphology.

In dorsal view, head with semicircular form, bearing slightly setae (Figure 4A₁); 2 main setae visible in front; genal processes completely reduced or absent. Median epicranial suture clearly dividing the vertex into 2 rectangular blocks of which the lengths are parallel to the eyes. Median ocellus on the 1/3 of the opening of the front; lateral ocelli at the bases towards the pronotum and plated against the compound eyes. Metascutellum bearing a dorsal process in form of two spines.

Antenna (Figure 4B₁) sparsely covered of setae on all the 10 segments. The first flagellomere is the longest, bearing apically a single rhinarium; 6th, 7th and 8th flagellomeres with 2 rhinaria. The 7th and 8th flagellomeres almost equal length. The 8th flagellomere bearing 2 subequal setae apically.

Forewing (Figure 4C₁) elongated; C+Sc vein bearing setae basally; R+M+Cu₁ item approximately equal length with M+Cu₁ item; R item length equal of R+M+Cu₁ plus M+Cu₁ items lengths. Pterostigma ovoid and narrowed apically but its central portion not pigmented. A dark area spreads out along the Cu₁ and Cu_{1b} veins; this dark area reaches the anal margin. Cu_{1a} item detached from Cu₁ item and progresses parallelly to vein M₁, and then curved towards the anal vein which is also parallel to M₃₊₄ item. M₁₊₂ item reaches the anal one not far from the apex of the wing and makes the r₂ cell be the longest cell of the forewing. All these veins are sparsely covered of setae. The cells m₁, m₂ and cu₁ bearing on their anal portion a radular spinule. Before the anal break, the anal is subdivided in several cells (5) and bearing also a small radular spinule. Claval suture clearly defined.

Hindwing bearing on C+Sc vein, spinules at the base on both sides of the costal break; there are 5 setae after the costal break plus the hamulus. Cu₂ base is pigmented. The branch M+Cu₁ not clearly defined; M item partially defined. Connection point of R item to R+M+Cu₁ not visible. Between Cu₂ and M items, two pigmented areas are connected to the anal.

Hind leg (Figure 5D₁) meracanthus relatively long. Metafemur and metatibia bearing simple setae but more dense on metatibia. Metatibia bearing 4 spurs apically (2 inner and 2 external) and a crown of sawtooth-shaped inner spines.

Male terminalia as in Figure 5E₁. Proctiger bi-articulated; basal article more developed, internal portion slightly elongated with setae on the sub-apical part. This part carries an internal short connective. Apical article, smaller and rectangular with setae. Paramere (Figure 5F₁) with proximal portion wide in profile and rounded apically. Paramere apically more sclerotized on the internal side. The paramere sparsely covered of setae. Aedeagus (Figure 5G₁) bisegmented, the distal segment thick on the third superior part with a dorsal depression.

Female terminalia (Figure 5H₁) with double dorsal valvulae, the dorsal valvula slightly longer; internal and

ventral valvulae sensibly equal length. Dorsal plate carries an excrescence before and on top of circumanal ring pore. Circumanal composed of two rows of pores and convoluted. The distal portion of female proctiger bearing dense setae. Ventral plate triangular bearing many setae in its apical portion. Measurements and ratios are found in tables 1 and 2.

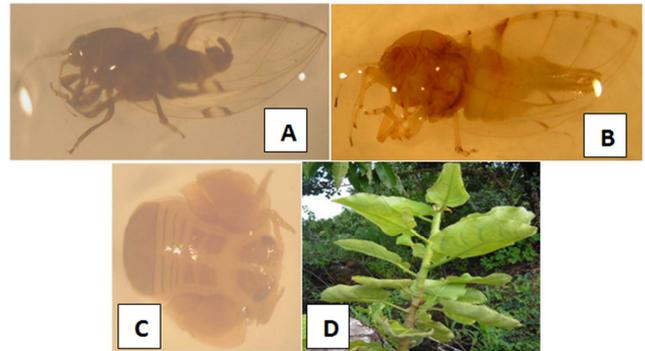


Figure 1. *Pseudoeriopsylla fouboti* sp.n. A: male, B: female, C: nymph, D: host *Ficus cf. ovate* (Moraceae).

Fifth instar immature (Figure 6I₁)

Colouration. the overall body of the fifth instar larva whitish, with reddish compound eyes (Figure 1C).

Morphology. Body covered by shorts setae and clearly divided into head, thorax and abdomen. Antenna with two segments. Forewing pads with veins. Four abdominal sclerites visible dorsally; the main part of caudal plate in dorsal position (Figure 6I₁). In ventral view, 3 abdominal sclerites distinctly visible. Bases of caudal plate widened. Hind leg Figure (6J₁) with 5 segments. Measurements and ratio are found in table 2.

Host plant: *Ficus cf. ovata* (Moraceae) (Figure 1D).

Biology: Adults and larvae on the inner surface of the leaves. The youngest larvae between bracts of the buds of the host plant. These larvae produce honey dew which attracts a great number of ants. Distribution: Cameroon (Foumbot-West-Cameroon).

Material examined: Holotype: Male, Cameroon: West Region, Foumbot, 10°38'N, 5°31'E, 1050 m, 10 April 2006, *Ficus cf. ovata* (V. J. Dzokou & J. L. Tamesse). Slides mounted (LZUY). Paratypes: Cameroon: 5 males, 9 females, 7 larvae, same data as holotype; 2 males, 2 females, 3 larvae. Dry and slide-mounted or preserved in 70% ethanol (NHMB); 1 male and 1 female preserved in 70% ethanol (MRAC); 2 males, 7 females, 3 larvae, 21 January 2018, *Ficus cf. ovata* (V. J. Dzokou), in 70% ethanol (LAZUDs).

Etymology: Named after the type locality, Foumbot in the Noun Division, Western Region of Cameroon.

Comments: The difference between *Pseudoeriopsylla mpoamei* and *Pseudoeriopsylla fouboti* sp.n. reside on several levels: *Pseudoeriopsylla mpoamei* (6,34 mm in male), is longer than *Pseudoeriopsylla fouboti* sp.n. (4,47 mm in male); the pterostigma of *Pseudoeriopsylla fouboti* sp.n. carries a central clear zone whereas in *Pseudoeriopsylla mpoamei*, it carries a central rectangular band; the Cu_{1a} vein of *Pseudoeriopsylla mpoamei* incurved towards the M vein

while in *Pseudoeriosylla fouboti* sp.n. Cu_{1a} vein is not incurved toward the M vein; anal item before the anal break isolates a single cell in *Pseudoeriosylla mpoamei* while 5 cells are isolated in *Pseudoeriosylla fouboti* sp.n.; the hindwing of *Pseudoeriosylla fouboti* sp.n. bears pigmented zones; the first flagellomère of *Pseudoeriosylla mpoamei* bears several rhinaria while in *Pseudoeriosylla fouboti* sp.n. it bears a single apical rhinarium; the métatibia of *Pseudoeriosylla mpoamei* carries 5 spurs whereas *Pseudoeriosylla fouboti* sp.n. carries 4; the circumanal pore ring of *Pseudoeriosylla fouboti* sp.n. carries an excrescence; the forewing pad of the fifth instar larva carries a dark band in *Pseudoeriosylla mpoamei* while the forewing pad presents an apparent venation in *Pseudoeriosylla fouboti* sp.n.; the organization of the caudal plate is distinct in the two species as well as arolium of the metatibia leg; the apical segment of aedeagus with rounded apex in internal view in *Pseudoeriosylla fouboti* sp.n.; while in *Pseudoeriosylla mpoamei*, it has inner and external subapical grooves. The structure of the parameres and the proctiger are characteristic of the two species. The hindwing of *Pseudoeriosylla fouboti* sp.n. with a pigmented area on C+Sc vein and two on the anal vein; this character is specific for this species and not found to the others species of *Pseudoeriosylla* genus. The dorsal valvula of female terminalia is bi-lobed like *Homotoma* genus psyllids.

3.1.2. *Pseudoeriosylla Dschangi* sp.n.

[Figure 2, Figure 4 (A_2 , B_2 , C_2), Figure 5 (D_2 , E_2 , F_2 , G_2 , H_2), Figure 6 (I_2 , J_2)]

Description

Adult.

Colouration: Overall body in males is blackish, while in females it is greenish-yellowish (Figure 2A, 2B).

Morphology: The median epicranian suture of the head (Figure 4A₂) separates the vertex in 2 trapezoidal blocks. Median ocellus closer to the genal processes and visible dorsally. Lateral ocelli dark, and are posteriorly located to the limit with the compound eyes. Antennal cavities less large; genal processes not developed with short setae. In dorsal view, mesopraescutum, mesoscutum and mesoscutellum thrust out; mesoscutum clear in the middle portion, while the edges are dark, identical to metascutum. Metapostnotum with two dorsal processes as two spines; anterior abdominal tergites which follow the metapostnotum are clear.

The antennal first flagellomere (Figure 4B₂) is the longest and carries several rhinaria; flagellomeres 2, 3, 4, 5 and 6 have the same length relatively; 2nd flagellomere with 5-6 rhinaria; 3rd and 7th flagellomeres with a single rhinarium. 4th, 6th and 8th flagellomeres with 2 sub-apical rhinaria. 5th flagellomere without rhinarium. Flagellomeres 7 and 8 are more thicker and short; 8th flagellomere with 2 sub-terminal equal setae.

Forewing (Figure 4C₂), 2.24-2.29 times longer than wide in male while in female 2.03-2.43 times longer than wide. All the veins carry setae except the portion of anal behind the

anal break. Pterostigma rounded with strongly pigmented edges and clear medial portion. R+M+Cu₁ vein short and robust; R vein approximately 2 times longer than R+M+Cu₁ vein. R₁ very reduced because of the proximity of the base of the pterostigma. Rs vein extends to merge with the edge of pterostigma which is rounded. M+Cu₁ vein slightly longer than R+M+Cu₁ vein. Cu₁ vein also short. cu_2 cell with 2 strongly pigmented areas; the first area covered Cu_{1b} vein, Cu₁ vein and part of M+Cu₁ vein; while the second area covered the anal vein, extending to R+M+Cu₁ vein and part of M+Cu₁ vein. M vein approximately longer than Rs vein. M₁₊₂ vein joins the anal vein near the apex of the wing. Cells m_1 , m_2 and cu_1 carry each one a radular area.

Hind leg (Figure 5D₂) with well-developed meracanthus; trochanter bearing basal spine. Metafemur bearing small groups of spines on its surface. Metatibia subsequently bearing 2 crowns of small spines and 4 apical spurs. Metabasitarsus with 2 spurs.

Male terminalia (Figure 5E₂), proctiger made bi-articulated; basal segment carries a small groove due to the insertion of the proximal segment of the aedeagus; internal side rounded and covered with setae. Apical segment rectangular and sparse of setae. Sub-genital plate thrust out in the middle, truncate apically and carrying parameres also sparse of setae. Paramere (Figure 5F₂) with dense setae; in profile view, it appears elongate with rounded apex; internal side strongly sclerotized. Distal segment of aedeagus (Figure 5G₂) incurved internally with subapical groove and rounded apex.

Female terminalia (Figure 5H₂) with dorsal valvula which exceeds the inner and ventral valvula; inner valvula slightly shorter than ventral valvula. Dorsal plate with dense setae; circumanal composed of a convoluted single row of rounded pores. Sub-genital plate triangular, less long than the dorsal plate carrying setae especially on the ventral face. Measurements and ratios found in tables 1 and 2.

Fifth instar Larva (Figure 2C, 6I₂)

Colouration: Overall body greenish with whitish wing pads (Figure 2C).

Morphology: Body (Figure 6I₂) divided into head, thorax and abdomen. Antenna with 3 segments carrying short setae. Dorsally, the wing pads as well as the margins of the abdomen carrying short setae; forewing pad pigmented throughout its external margin; four visible sclerites on the abdomen; caudal plate almost entirely in dorsal face. Ventrally legs with 6 segments; hind leg (Figure 6J₂) arolium between two claws pad; the tarsus without setae; two sclerites are visible as well as the openings of 4 stigmas; some setae line the ventral surface of the abdomen. Measurements and ratio found in table 2.

Distribution: Cameroon ((Dschang-West-Cameroon).

Host plant: *Ficus thonningii* (Moraceae) (Figure 2D).

Biology: Adults and larvae live and feed on the roots of *F. thonningii*. The larvae produce white wax which entirely covers these roots. A colony of ants is associated at these larvae in search of the honey dew secreted by those larvae.

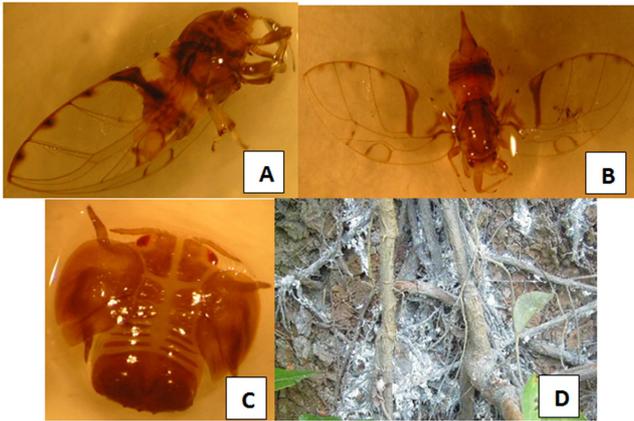


Figure 2. *Pseudoeriopsylla dschangii* sp.n. A: male, B: female, C: nymph, D: host *Ficus thonningii* (Moraceae).

Material examined: Holotype: Male, Cameroon: West Region, Dschang, 10°04'N, 5°26'E, 1385 m, 18 June 2007, *Ficus thonningii* (V. J. Dzokou & J. L. Tamesse). Slides mounted (LZUY). Paratypes: Cameroon: 17 males, 18 females, 15 larvae, same data as holotype; 2 males, 3 females, 3 larvae, dry- and slide-mounted or preserved in 70% ethanol (NHMB); 1 male, 1 female, 1 larva, preserved in 70% ethanol (MRAC); 9 males, 13 females, 7 larvae, 23 January 2018, *Ficus thonningii* (V.J. Dzokou), in 70% ethanol (LAZUDS).

Etymology: Named after the type locality, Dschang in the Menoua Division, Western Region of Cameroon.

Comment: The pterostigma of *Pseudoeriopsylla dschangii* sp.n. is distinctly rounded; in *Pseudoeriopsylla etoundii* is also rounded but little elongate; their margins are dark and their centre clear. In *Pseudoeriopsylla dschangii* sp.n., radular areas on the anal vein are simple and similar to those of *Pseudoeriopsylla fouboti* sp.n. and *Pseudoeriopsylla bitomi*. Cell Cu_2 of *Pseudoeriopsylla dschangii* sp.n. has two dark areas; the first area flanked against the margin of the Cu_1 vein and Cu_{1b} vein similar to that of *Pseudoeriopsylla mpoamei*, *Pseudoeriopsylla fouboti* sp.n. and *Pseudoeriopsylla njonfangi* sp.n.; the second dark area is before the anal towards the base of the wing without touching the $R+M+Cu_1$ and $M+Cu_1$ veins; different of that of *Pseudoeriopsylla bitomi* where the dark area covers all the base of the wing. The 1st flagellomere of the antenna of *Pseudoeriopsylla dschangii* sp.n. bears several rhinaria identical to that of *Pseudoeriopsylla mpoamei* and *Pseudoeriopsylla njonfangi* sp.n.; for the 2nd flagellomere, *Pseudoeriopsylla njonfangi* sp.n. has 2 sub-apical rhinaria, approximately 7 in *Pseudoeriopsylla dschangii* sp.n. and approximately 5 in *Pseudoeriopsylla mpoamei*.

3.1.3. *Pseudoeriopsylla Njonfangi* sp.n.

[Figure 3, Figure 4 (A₃, B₃, C₃), Figure 5 (D₃, E₃, F₃, G₃, H₃), Figure 6 (I₃, J₃)

Description

Adult

Colouration: Overall body in male is dark while in female it is little clear (Figure 3A).

Morphology: Head as in figure 4A₃. Median suture well defined with a dark spot, median ocellus visible in dorsal view. Genal processes slightly arched on both sides median suture at the base of the scape. Lateral ocelli found towards the inner base of the compound eyes. Cavity of the antenna less large, vertex without setae.

Scape and pedicel of the antenna (Figure 4B₃) are deprived of setae while the other segments bearing setae. 1st flagellomere is the longest and carrying several rhinaria; flagellomeres 2, 3, 4, 5 and 6 have the equal length approximately. Flagellomere 2 with 2 sub-apical rhinaria; flagellomeres 3, 4, 5, 6 and 7 each with a single sub-apical rhinarium. Flagellomeres 7 and 8 are thicker; the latter almost round and carries 2 sub-terminal unequal setae.

Forewing (Figure 4C₃) with trapezoidal pterostigma thickly pigmented in black, except in its centre where there is a clear band. Except the anal, all the other veins are sparse with setae. $R+M+Cu_1$ vein is short and robust; R vein is 2 times the length of $M+Cu_1$ vein. Cu_1 vein very short, presenting the half of $R+M+Cu_1$ vein length. Before the anal break, the anal is subdivided in An_1 and An_2 veins and covered by dark area. A thickly pigmented area covered Cu_{1b} vein, Cu_1 vein and part of anal vein. M_{1+2} vein joins the anal vein near the apex of the wing; r_2 cell very widened; Cu_{1a} vein parallel to M vein on the proximal portion before curving towards the anal thereafter. Cells m_1 , m_2 and cu_1 carry a radular area; these radular areas are included in a pigmented continuation forming a type of sinusoid.

$C+Sc$ vein of the hindwing carries setae organized in 3 groups; 9 setae at the base, 3 setae in the middle and one isolated seta. Only $R+M+Cu_1$ and Cu_2 veins are visible.

Hind leg (Figure 5D₃) with moderate developed meracanthus; metafemur with some spines on the dorsal face; same for metatibia. A crown of small spines raises the apical part of metatibia which ends by 5 spurs, 3 external and 2 internal; basimetatarsus without spur.

Male terminalia (Figure 5E₃), proctiger bi-segmented; basal segment 3 times broader than the apical segment, its antero-dorsal portion sparse of setae. Apical segment rectangular, covered with setae. Sub-genital plate opaque and bears setae where some are very long. Paramere (Figure 5F₃), elongate with setae and slightly incurved internally. Distal segment of aedeagus (Figure 5G₃), with apical inflation, sub-apical groove and rounded apex.

Female terminalia (Figure 5H₃), the inner and ventral valvulae drowned in the dorsal valvula. Ventral valvula longer than internal valvula. Dorsal plate with setae on the upper surface. Circumanal with a dorsal excrescence and 2 complex convoluted rows of pores. Ventral plate overall triangular with also setae on lower surface. Measurements and ratios found in tables 1 and 2.

Fifth instar Larva (Figure 3B, 6I₃)

Colouration: overall body of fifth instar larva is brown (Figure 3B).

Morphology. Body (Figure 6I₃) divided into head, thorax and abdomen. Antenna made of three segments. Dorsally, the wing pads carry short setae on their external margin also all along this margin. Four ventral abdominal sclerites visible; the major part of the caudal plate is in dorsal position. Three stigma orifices are visible ventrally and the abdomen is sparsely covered by setae. Arolium of hind leg is characteristic (Figure 6J₃), and located between the two claws; the segment bearing arolium has a single weakly developed seta compared to the others. Measurements and ratio found in table 2.

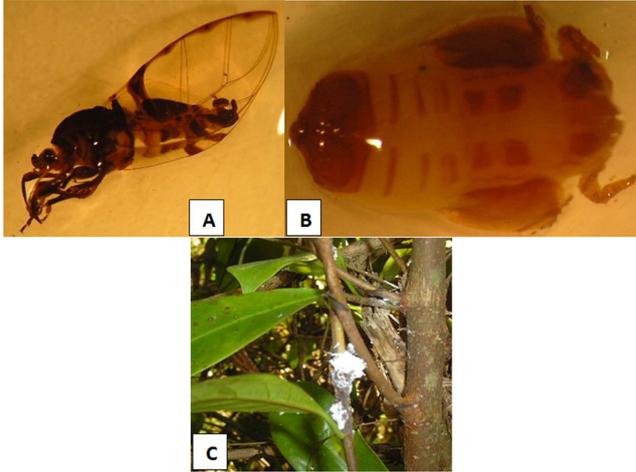


Figure 3. *Pseudoeropsylla njonfangi* sp. n. A: male, B: nymph, C: host *Ficus preussii* (Moraceae).

Host plant: *Ficus preussii* (Moraceae) (Figure 3C).

Biology: Larvae are found on the young buds and between bracts of the leaves of *F. preussii*; they produce white wax.

Distribution: Cameroon (Nkop-West-Cameroon).

Material examined: Holotype: Male, Cameroon: West Region, Nkop, 10°04'N, 5°26'E, 1385 m, 27 March 2006, *Ficus preussii* (V. J. Dzokou & J. L. Tamesse). Slides mounted (LZUY). Paratypes: Cameroon: 1 female, 6 larvae, same data as holotype; 1 male, 1 female, 1 larva, dry- and slide-mounted or preserved in 70% ethanol (NHMB).

Etymology: The species is dedicated to Emmanuel Njonfang, Professor in the Department of Biology, Higher Teacher's Training College, University of Yaoundé I, who facilitated the realization of this work.

Comments: Pterostigma of *Pseudoeropsylla njonfangi* sp. n. is trapezoidal, its conical apical end is similar of that in *Pseudoeropsylla fouboti* sp. n.; the central clear band of the pterostigma is triangular. The pigmented area of cu_2 cell is similar to that of *Pseudoeropsylla mpoamei*, *Pseudoeropsylla fouboti* sp. n. and *Pseudoeropsylla dschangi* sp. n. The anal vein is covered by a sinusoidal pigmented area drowning the 3 radular spinules. Metabasitarsus of *Pseudoeropsylla njonfangi* sp. n. lacks spur; while in *P. etoundii* the metabasitarsus carries only one spur whereas in *P. mpoamei*, *Pseudoeropsylla fouboti* sp. n., *P. bitomi* and *Pseudoeropsylla dschangi* sp. n. there are 2 spurs.

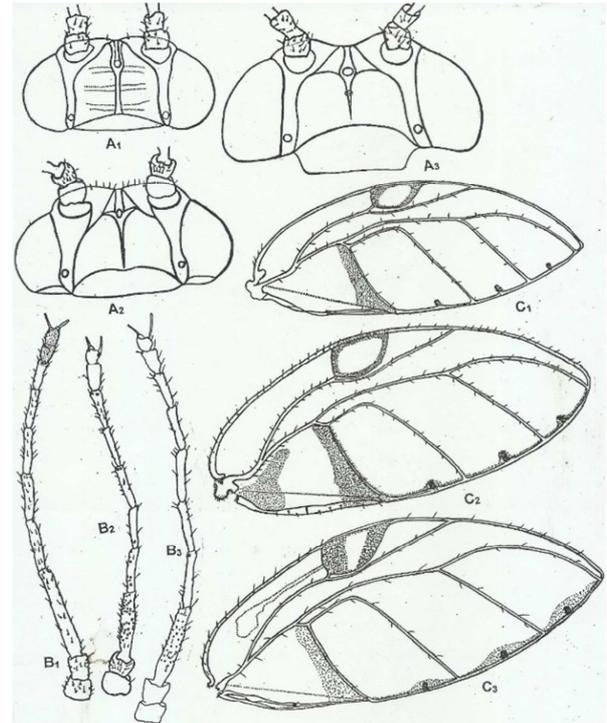


Figure 4. *Pseudoeropsylla* spp. (A): Head, in dorsal view; (B): Antenna; (C): Forewing. *P. fouboti* sp. n. (A₁-B₁-C₁); *P. dschangi* sp. n. (A₂-B₂-C₂); *P. njonfangi* sp. n. (A₃-B₃-C₃). Scale bars: a=4 mm (C); b= 1.6 mm (A, B₁, B₂); c= 0.8 mm (B₃).

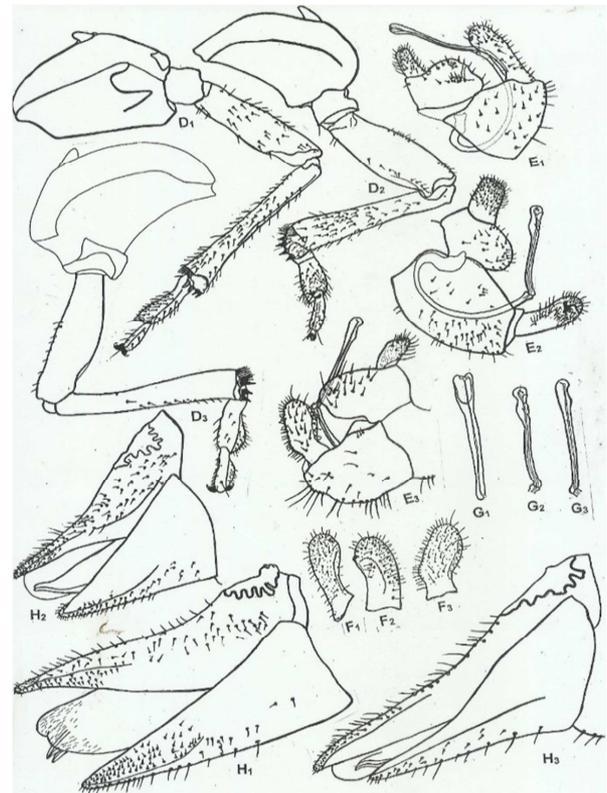


Figure 5. *Pseudoeropsylla* spp. (D): Hind leg, in profile; (E): Male terminalia, in profile; (F): Paramere, in profile, inner surface; (G): Distal segment of aedeagus, in profile, G₁-G₃ (inner surface), G₂ (external view); (H): Female terminalia, in profile. *P. fouboti* sp. n. (D₁-E₁-F₁-G₁-H₁); *P. dschangi* sp. n. (D₂-E₂-F₂-G₂-H₂); *P. njonfangi* sp. n. (D₃-E₃-F₃-G₃-H₃). Scale bars: b= 1.6 mm (D, E₁, E₂, F₁, F₂, G₂, G₃, H), c= 0.8 mm (E₃, F₃, G₁).

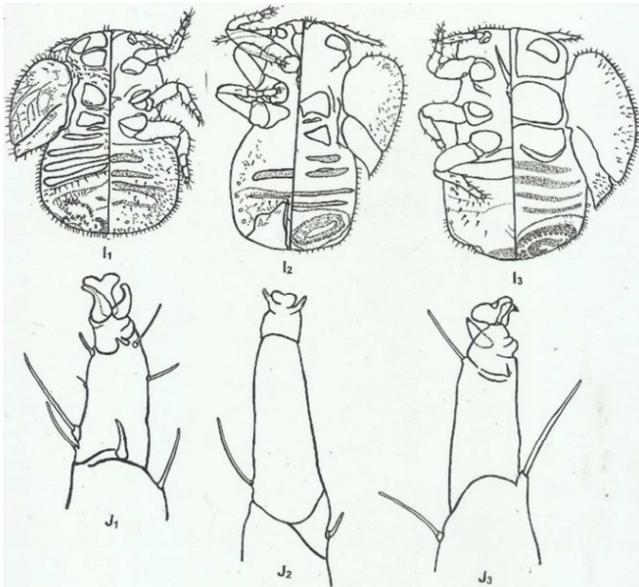


Figure 6. *Pseudoeriopsylla* spp. nymphs. (l1): Fifth instar larvae, (J1): Tibiotarsus portion; *P. fouboti* sp. n. (l1-J1); *P. dschangi* sp. n. (l2-J2); *P. njonfangi* sp. n. (l3-J3). Scale bars: a= 4 mm (l), d= 0.4 mm (J).

3.2. Discussion

The species of the genus *Pseudoeriopsylla* are african and feed on *Ficus* plants. Six species living on *Ficus* genus (Moraceae) are exclusively found in the Western highlands of Cameroon. *Pseudoeriopsylla mpoamei* and *P. bitomi* are associated with *Ficus platyphylla*, but were collected on different plants at different locations. *Ficus preussii* host *Pseudoeriopsylla njonfangi* sp.n. and another psyllid of *Pauropsylla* genus, Triozidae family. The larvae of *Pauropsylla* sp. induce aureoles on the underside of the leaves, while those of *Pseudoeriopsylla njonfangi* sp.n. produce white wax that covers them. There is no segregation of feeding niches in the adults of the two species. *Pseudoeriopsylla etoundii* is associated with *Ficus leprieuri*, *Pseudoeriopsylla*

dschangi sp.n. with *Ficus thonningii*, *Pseudoeriopsylla njonfangi* sp.n. with *Ficus preussii* and *Ficus* cf. *ovata*. The psyllid of *Ficus thonningii* feed only on the roots and basal trunk of its host plant. No larva or adult was found on the plant leaves. The six species of *Pseudoeriopsylla* from Western-Cameroon are compared with the african species of the same genus. *Pseudoeriopsylla nyasae* is found in Malawi and Mozambique on *Ficus thonningii*; *Pseudoeriopsylla laingi* from Angola, Kenya, Uganda, Nigeria, Sierra Leone, Guinea and Senegal on *Ficus thonningii* and *Ficus natalensis*. In Cameroon, a single female of *Pseudoeriopsylla laingi* was collected on yellow trap in 1957 by Eastop in Bamenda (North-West) [9]; *Pseudoeriopsylla medleri* is known in Nigeria and *Pseudoeriopsylla carvalhoi* in Angola, Democratic Republic of Congo and Nigeria, associate with *Ficus ovata*, but its larvae remain unknown. *Pseudoeriopsylla kenya*e is found in Kenya and *Pseudoeriopsylla etiennei* in Senegal on *Ficus* spp.

Pseudoeriopsylla mpoamei is similar to *Pseudoeriopsylla fouboti* sp.n. in the form of the pterostigma, but they differ on the forewing pigmentation bands. The elongate form and the pigmentation of the pterostigma of *Pseudoeriopsylla bitomi* are specific but closer to what is observed to *Mycopsylla* species, except that their pterostigmas are not pigmented [9]. In *P. kenya*e, *P. etiennei*, *Pseudoeriopsylla fouboti* sp.n., *P. bitomi* and *P. etoundii*, the 1st flagellomere carries a single sub-apical rhinarium [9, 10, 11]. In *P. nyasae*, *P. laingi*, *P. carvalhoi*, *Pseudoeriopsylla dschangi* sp.n. and *Pseudoeriopsylla njonfangi* sp.n., the 1st flagellomere carries several rhinaria or more than one rhinarium. The pterostigma of *Pseudoeriopsylla dschangi* sp.n. is more rounded than that of *Pseudoeriopsylla njonfangi* sp.n. The distal portion of aedeagus and the female terminalia are totally different in the *Pseudoeriopsylla* species.

Table 1. Measurements (in mm) of adult *Pseudoeriopsylla* species.

Parameters	<i>Pseudoeriopsylla fouboti</i> sp. n.				<i>Pseudoeriopsylla dschangi</i> sp.n.				<i>Pseudoeriopsylla njonfangi</i> sp. n.											
	Male		Female		Male		Female		Male	Female										
	N	Min	Max	Average	N	Min	Max	Average	N	N										
BL	15	4	4,62	4,47	15	5,12	6,12	5,62	23	4,75	5,5	5	23	5,3	6,6	5,89	1	7,7	1	6,2
BW	15	1,4	1,5	1,44	15	1,5	1,6	1,56	23	1,56	1,75	1,63	23	2	2	1,94	1	2	1	1,8
HW	15	0,94	1,25	1,13	15	1,12	1,25	1,17	23	1,12	1,25	1,21	23	1,3	1,6	1,37	1	1,5	1	1,45
AL	15	1,75	2,12	1,88	15	1,56	1,75	1,66	23	2	2,12	2,09	23	2	3	1,95	1	2,4	1	2,1
FL	15	0,4	0,6	0,52	15	0,4	0,6	0,51	23	0,37	0,44	0,38	23	0,3	0,5	0,34	1	0,4	1	0,5
FWL	15	4,62	5,25	5,05	15	5,3	5,87	5,51	23	5,87	6,31	6,1	23	6,1	7,3	6,63	1	7,9	1	7,4
FWW	15	2,12	2,25	2,19	15	2,25	2,5	2,38	23	2,62	2,75	2,66	23	3	3	3	1	3,4	1	3,85
HWL	15	2	3	2,62	15	2,87	3,25	3,05	23	3	3,31	3,17	23	3,3	3,8	3,52	1	3,9	1	3,9
HWW	15	0,75	1,25	0,99	15	1	1,37	1,15	23	1,5	1,56	1,51	23	1,5	1,9	1,66	1	1,9	1	2
DSAL	15	0,4	0,6	0,51					23	0,44	0,5	0,46					1	0,62		
PL	15	0,37	0,5	0,45					23	0,37	0,5	0,43					1	0,4		
MPL	15	0,44	0,62	0,52					23	0,37	0,5	0,41					1	0,5		
MFL	15	0,75	0,87	0,84	15	0,75	0,87	0,79	23	0,87	1	0,91	23	0,9	1,3	1,01	1	1,1	1	0,9
MTL	15	1	1,12	1,09	15	1	1	1,04	23	1,12	1,25	1,18	23	1,1	1,4	1,25	1	1,4	1	1
FWL/FWW	15	2,18	2,33	2,29	15	2,36	2,35	2,31	23	2,24	2,29	2,29	23	2,03	2,43	2,21	1	2,32	1	1,92
FWL/HWL	15	2,31	1,75	1,93	15	1,85	1,81	1,81	23	1,96	1,91	1,92	23	1,85	1,92	1,88	1	2,02	1	1,89
HWL/HWW	15	2,67	2,4	2,64	15	2,87	2,37	2,65	23	2	2,12	2,1	23	2,2	2	2,11	1	2,05	1	1,95

Parameters	<i>Pseudoeriosylla fouboti</i> sp. n.				<i>Pseudoeriosylla dschangii</i> sp.n.				<i>Pseudoeriosylla njonfangi</i> sp. n.											
	Male		Female		Male		Female		Male		Female									
	N	Min	Max	Average	N	Min	Max	Average	N	Min	Max	Average	N	N						
AL/FL	15	4,37	3,53	3,61	15	3,9	2,92	3,25	23	5,4	4,82	5,36	23	6,67	6	5,73	1	6	1	4,2
MPL/HW	15	0,47	0,49	0,46					23	0,33	0,4	0,35					1	1,6		
MTL/HW	15	1,06	0,89	0,96	15	0,89	0,8	0,87	23	1	1	0,97	23	0,84	0,87	0,91	1	0,34	1	0,69
AL/HW	15	1,86	1,69	1,66	15	1,39	1,4	1,42	23	1,78	1,69	1,73	23	1,54	1,87	1,42	1	0,96	1	1,45
FL/HW	15	0,42	0,48	0,46	15	0,36	0,48	0,43	23	0,33	0,35	0,32	23	0,23	0,31	0,25	1	0,34	1	0,34
FPL					15	1,62	2	1,82					23	1,3	1,9	1,53			1	2,4
FSPL					15	1,5	1,6	1,53					23	0,9	1,14	1,12			1	1,2
FPL/FSPL					15	1,08	1,25	1,19					23	1,44	1,66	1,36			1	2
PTL	15	0,62	0,75	0,72	15	0,81	0,87	0,84	23	1	1,12	1,04	23	0,9	1,12	1,09	1	1,4	1	1,4
RL	15	1,62	1,87	1,67	15	1,81	1,94	1,88	23	2	2,25	2,1	23	2	2,44	2,29				
a	15	1,87	2,12	1,99	15	2,12	2,25	2,18	23	2,12	2,19	2,13					1	3,1	1	3
b	15	1,5	1,62	1,58	15	1,62	1,87	1,77	23	1,75	1,87	1,79	23	1,9	2,2	2	1	2,4	1	2,3
c	15	0,94	1,25	1,07	15	1	1	0,92	23	1	1,06	1,02	23	1,1	1,3	1,18	1	1,4	1	1,4
d	15	1	1,25	1,15	15	1,25	1,37	1,29	23	1,12	1,25	1,18	23	1,25	1,85	1,53	1	3,1	1	3
e	15	1,25	1,37	1,32	15	1,5	1,8	1,58	23	1,56	1,62	1,6	23	1,6	2	1,82	1	2,1	1	2

Table 2. Mensurations (in mm) of firth instar *Pseudoeriosylla* larvae.

Parameters	<i>Pseudoeriosylla fouboti</i> sp. n.				<i>Pseudoeriosylla dschangii</i> sp. n.				<i>Pseudoeriosylla njonfangi</i> sp. n.			
	N	Min	Max	Average	N	Min	Max	Average	N	Min	Max	Average
BL	13	2,44	2,81	2,66	20	3,1	3,9	3,5	7	1	1	0,96
BI	13	2,3	3,1	2,56	20	3	3,5	3,28	7	1,4	1,9	1,6
AL	13	0,62	0,87	0,71	20	0,87	1	0,92	7	3	4	3,54
FWL	13	1,25	1,87	1,58	20	1,62	2	1,82	7	3	3,6	3,2
LCPL	13	0,75	0,87	0,85	20	1	1	0,8	7	0,4	0,7	0,53
LCPW	13	1,62	1,87	1,78	20	1,5	1,75	1,66	7	1,1	1,9	1,31

Abbreviations of Tables 1 and 2: BL: body length; BW: body width; HW: head width; M L: metatibia length; MFL: metafemur length; AL: antenna length; PL: paramere length; MPL: male proctiger length; SPL: sub-genital platelength; DSAL: distal segment of aedeagus length; FWL: fore wing length; FWW: fore wing width; HWL: hind wing length; HWW: hind wing width; Max: maxima; Min: minima; Mea: mean; N: number of individuals; RL: r2 length; a: vein M1+2 length; b: vein M3+4 length; c: cell m1 margin length; d: cell cu₁ length; e: thickness of the cell cu₁; PTL: pterostigma length; LCPL: larva caudal plate length; LCPW: larva caudal plate width; A L/HW: ratio antenna length and head width; AL/FL: ratio antenna length and flagellomere 1 length; MPL/HW: ratio male proctiger length and head width; FWL/FWW: ratio forewing length and forewing width; FWL/HWW: ratio hindwing length and hindwing width; FWL/HWL: ratio forewing length and hindwing length; HWL/HWW: ratio hindwing length and hindwing width; MTL/HW: ratio metatibia length and head width; FPL/FSPL: ratio female proctiger length and sub-genital plates length.

4. Conclusion

The 3 species described here are different compared to the known species of the genus. They are *Ficus*-feeding psyllids. Morphometric characters show that the 3 species are new to science. This work increases the number of *Pseudoeriosylla* described from nine to twelve in the world and brings up to seven the number of described species from Cameroon.

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