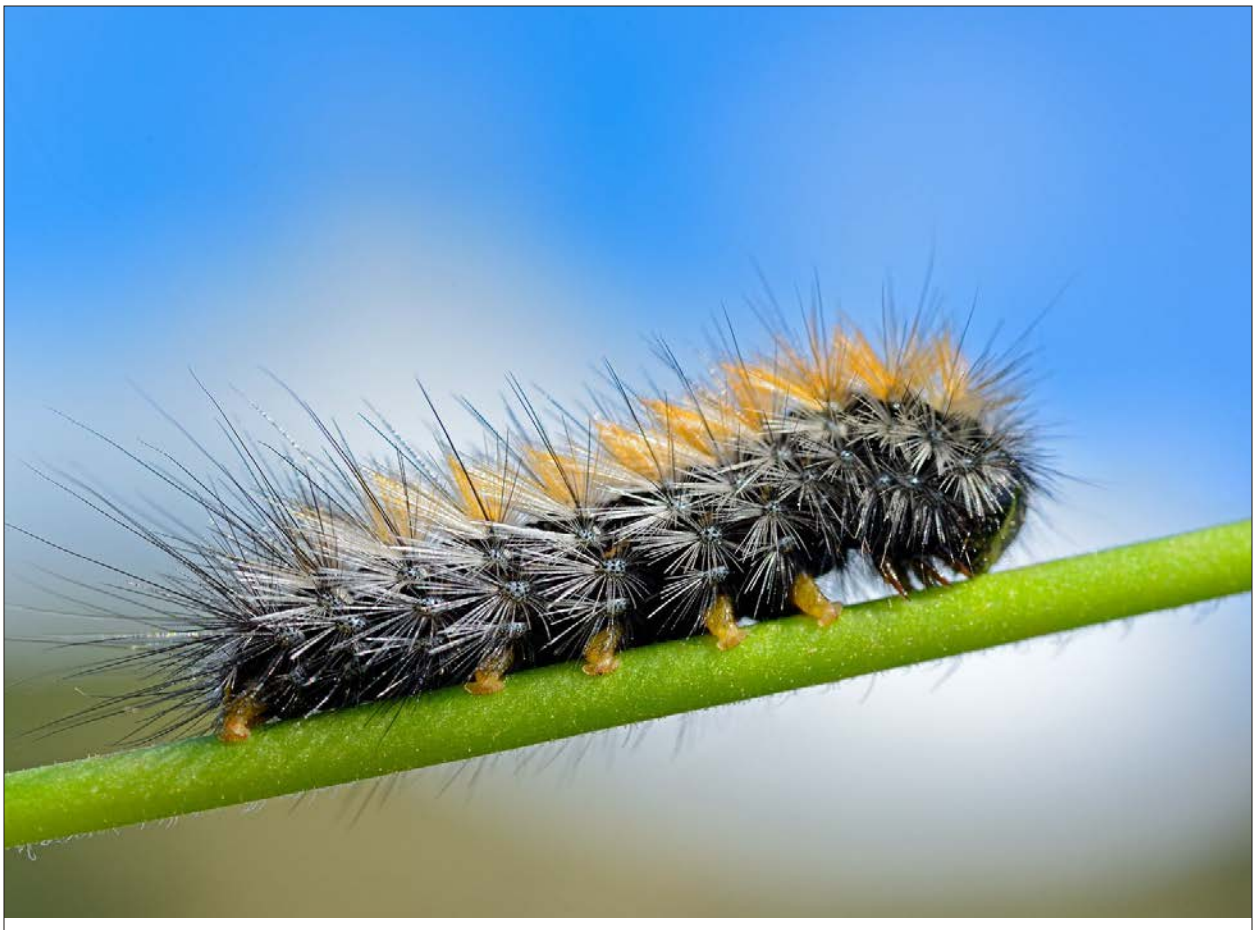

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Jumping Plant-Lice of the Family Psyllidae (Hemiptera: Psylloidea) From West-Cameroon: Biodiversity and Host Plants

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Abstract: From 2005 to 2007, field studies undertaken in West-Cameroon permitted to enrich the biodiversity of Psyllids of Psyllidae family. This family include 7 sub-families which are: Aphalaroidinae with *Yangus* genus (4 species); Ciriacreminae with 3 genus and species (*Heteropsylla cubana*, *Ciriacremum* sp., *Kleiniella* sp.); Diaphorininae with 2 genus, *Diaphorina* (4 species) and *Epipsylla* (1 species); Paurocephalinae with 2 genus, *Paurocephala* (5 species) and *Diclidophlebia* (1 species); Rhinocolinae with 2 genus, *Cerationotum* (2 species) and a new genus with 1 species; Spondyliaspidinae with 2 genus, *Ctenarytaina* (1 species) and *Blastopsylla* (1 species); Psyllinae sub-family is the most diverse with 14 genus among which only 4 genus are knew; *Cacopsylla* (1 species), *Acizzia* (1 species), *Psylla* (3 species), *Palaeolinbergiella* (4 species); 5 genus are new to Science. Among the 37 species captured during this survey, 35 are unknown and *Blastopsylla occidentalis*, *eucalyptus* psyllid is captured for the first time in West-Cameroon. Host plants belong to more than 16 families. The damages caused by psyllids are mainly leaves folded, wrapped, deformed, discolourated with necrosis and these leaves become dry.

Key words: Biodiversity, psyllid, aphalaroidinae, ciriacreminae, diaphorininae, paurocephalinae, rhinocolinae, spondyliaspidinae, psyllinae

INTRODUCTION

Psyllids or jumping plant-lice are generally very host specific plant-sap sucking insects (Burckhardt *et al*., 2006a). They can be harmful to their angiosperm hosts in removing large quantities of plant-sap, in producing honey dew and this soiling leaves and fruits or attracting slime moulds, or by transmitting diseases (Burckhardt *et al*., 2004). Data on biodiversity and taxonomy of psyllids are well known in the temperate and sub-tropical regions. Few records are knew from Africa, South Sahara and in Cameroon in particular. The Convention on the Biological Diversity adopted during the summit of Rio de Janeiro recommends the conservation and the sustained use of the biodiversity and the genetics resources. In several groups, in particular those rich in number of species as it is the case of insects, only a little proportion of existing species is described. This situation has been considered as the obstacle to the taxonomy by the Global Taxonomy Initiative.

In Cameroon, within the Triozidae family, Tamesse *et al*. (2007) recorded two genus and 35 species; the genus *Trioza* has 24 species and the genus *Pauropsylla* has only 11 species. Within the Psyllidae family, no biodiversity and taxonomy studies have been undertaken in various regions of this

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country. Some psyllids of Psyllidae family are considered as the major pest of some cultivated plants or of pharmaceutical and commercial timber of greater importance as *Ricinodendron heudelotii* (Messi *et al*., 1998). The taxonomy studies of some psyllids of Psyllidae family have been recently published from Cameroon; it is the case of five species of *Diclidophlebia* genus (Burckhardt *et al*., 2006b) and it is also the case of three species of *Ciriacremum* genus (Tamesse, 2005).

Cameroon is a country situated in the Central Africa at the extreme North-East of the Gulf of Guinea with a surface area of 475,000 km^2. The climate is equatorial in the South with a vegetation of dense forest and tropical in the northern part with the grass field, the sahel and the desert. Local factors such as continentally, proximity to the sea and altitude have introduced some regional nuance.

The Western Province is one of the ten administrative provinces of Cameroon; its surface area is about 13,892 km^2. It is composed of Bamoun plateau and the grass-high lands. The climate is pseudo-tropical of altitude (Cameroonian climate of altitude), hot and wet with two seasons; one wet for about 8 months and the other dry for about 4 months. The altitude is between 697 m at Magba and 1840 m at Bangou. The longitude is between 9°58' at Santchou and 11°14' at Magba. The latitude is between 5°03' at Bassamba and 5°58' at Magba or Tonga. The majority of soils are volcanic and rich enough. The original vegetation has ceded to crops (maize, bean and bananas), fruit trees (*Dacryodes edulis*, *Pearsea americana*, *Mangifera indica*, *Cola* sp., *Theobroma cacao*, *Citrus* sp.) and also vegetables (*Vernonia* sp., *Crassocephalum* sp., etc.).

In South Africa psyllids biodiversity is well known in Africa (Tamesse *et al*., 2007). Twenty eight species of *Diaphorina*, 3 species of *Paurocephala*, 2 species of *Acizzia*, one species of *Psylla* and one of *Ctenarytaina* within the Psyllidae family were recorded in Africa. In Cameroon, the only known psyllid family biodiversity is the Triozidae studied by Tamesse *et al*. (2007). It is therefore very important to better know the diversity of different psyllids family and especially from the Western part of the country. The species involved usually caused damages to their host plants. In order to undertake an integrated pest management against psyllid in Cameroon. The aim of this study was to study the biodiversity of psyllids of Psyllidae family and to list all the species and the material recorded in Western Cameroon and their host plants.

MATERIALS AND METHODS

Psyllidae were collected in 6 Divisions in West-Province and in Bambui in the North-West Province of Cameroon from 2005 to 2007 (Table 1).

Psyllids were captured with the help of an entomological net of 0.5 mm mesh size and with the help of a mouth aspirator. Host plants and only accessible branches (2 m high) were visually searched at random. Psyllids seen on the lower four feet of canopy were captured with the help of the mouth aspirator. These insects were preserved in the 70% alcohol. The collection (Table 2) is kept in the Laboratory of Zoology, University of Yaoundé I (LZUY) and in the Naturhistorisches Museum Basle, Switzerland (NHMB). Psyllids were identified under stereomicroscope using keys of Hollis (1976), White and Hodkinson (1985), Burckhardt (1986, 1987b, 1991, 1996), Burckhardt and Misfud (2003), Burckhardt and Lauterer (1989), Heslop-Harrison (1951, 1959, 1960) and Ossiannilson (1992). Host plants were identified in National Herbarium at Yaounde (Cameroon) and kept in the Laboratory of Zoology.

Table 1: Divisions, subdivisions and localities where, Psyllidae were collected with their geographic co-ordinates in Western and in North West Cameroon

Division	Subdivision	Locality	Longitude	Latitude	Altitude (m)
Ménoua	Dschang	Lingang	10°04′	5°26′	1385
1380 km^2		Foto-Chefferie			
		Tsinfeum			
		Fonakeukeu			
		Nzem			
		Nkop			
		Dschang-ville			
		Meteu			
		Makong			
		Foréké-Falaise			
		Kentsop			
		Tsinkop			
		Leppe			
		Denkop			
	Fongo-Tongo	Fossong	10°04′	5°26°	1385
		Dedah			
	Penka-Michel	Bansoa-chefferie	10°14′	5°28′	1440
		Banegang			
	Santchou	Mbokou	9°58′	5°17′	709
		Mbongo			
	Fokoué	Fomopéa	10°07	5°22′	1560
Noun	Foumbot	Nkouogouo	10°38′	5°31′	1050
7 687 km^2	Massangam	Massangam	11°00′	5°26′	740
	Magba	Mappé	11°14′	5°58′	697
Hauts-plateaux	Bamendjou	Mboum	10°20′	5°23′	1615
415 km^2		Nkang			
		Ndang			
		Bangam			
	Baham	Baham-ville	10°22′	5°20′	1600
		Megang			
Ndé	Bagangté	Banékané	10°31′	5°09′	1400
1524 km^2		Mango'o			
Bamboutos	Mbouda	Bafounda	10°16′	5°38′	1420
1173 km^2					
Mifi 402 km^2	Bamougoum	Basse-Bamougoum	10°19′	5°30′	1390
Mezam					
(North West)					
1745 km^2	Tubah	Bambui	10°13′	6°01′	1253

Table 2: List of known species of Psyllidae (Hemiptera: Psylloidea) from West-Cameroon with their host plants, the region where, species were collected for the first time and references of described species

Species	Host plants	Regions (first record of any specimen)	Code NHMB
Subfamily Aphalaroidinae			
Yangus sp.n.1	*Albizia* cf. *adianthifolia* (Mimosaceae)	Menoua (Lingang)	CAM064
Yangus sp.n.2	*Albizia* cf. *attissima* (Mimosaceae)	Menoua (Fongo-Tongo)	CAM027
Yangus sp.n.3	*Albizia zygia* (Mimosaceae)	Noum (Foumbot)	CAM042
Yangus sp.n.4	*Albizia glaberrima* (Mimosaceae)	Menoua (Mbokou- santchou)	CAM131
Subfamily Ciriacreminae			
Ciriacremum sp.	Unknown	Menoua (Foto-Leppe)	D73
Kleiniella sp.	Unknown	Menoua (Foto-chefferie)	D60
Heteropsylla cubana	*Leucena glauca* (Mimosaceae)	Menoua (Dschang)	CAM075
Subfamily Diaphorininae			
Diaphorina sp.n.1	*Maytenus senegalensis* (Celastraceae)	Noum (Foumbot)	CAM056
Diaphorina sp.n.2	*Vernonia amygdalina*	Menoua (Dschang)	CAM055a
	Crassocephalum mannii (Asteraceae)		
Diaphorina sp.n.3	*Globimetula braunii* (Loranthaceae)	Menoua (Fongo-Tongo)	CAM117
Diaphorina sp.n.4	*Microglossa angolensis* (Asteraceae)	Nord-West (IRAD Bambui)	CAM05b
Epipsylla sp.	Unknown	Menoua (Fongo-Tongo)	D44

Table 2: Continued

Species	Host plants	Regions (first record of any specimen)	Code NHMB
Subfamily Paurocephalinae			
Paurocephala sp.n.1	*Dombeya ledermannii* (Sterculiaceae)	Menoua (Lingang)	CAM020
Paurocephala sp.n.2	*Psorospermum* cf *aurantiacum* (Hypericaceae)	Menoua (Fonakeukeu)	CAM024
Paurocephala sp. near *hollisi*	*Cnestis ferruginae* (Connaraceae)	Noun (Massangam)	CAM146
Paurocephala sp.n.4	*Psorospermum* sp. (Hypericaceae)	Ndé (Bangangté)	CAM013
Paurocephala sp. near *insolita*	*Psorospermum aurantiacum* (Hypericaceae)	Menoua (Foto-Nzem)	CAM143
Diclidophlebia sp.n.	*Boehmeria platyphylla* (Urticaceae)	Menoua (Mbokou sancthou)	D55
Subfamily Rhinocolinae			
Cerationotum sp.n. cf. *bicorne*	*Lannea* sp. (Anacardiaceae)	Noum (Foumbot)	CAM 059
Cerationotum sp.n.cf. *cuneipennis*	*Lannea* sp. (Anacardiaceae)	Noum (Foumbot)	CAM 060
Gen. sp.n.	*Bersama abyssinica* (Melianthaceae)	Noun (Massangam)	CAM001
Subfamily Spondyliaspidinae			
Ctenarytaina sp.n.	*Syzygium guineense* (Myrtaceae)	Hauts-Plateaux (Mboum-Bamendjoui)	CAM058
Blastopsylla occidentalis	*Eucalyptus globulus* (Myrtaceae)	Menoua (Foto-Nkop)	CAM061
Subfamily Psyllinae			
Psylla s.I. sp.n.1	*Tapinanthus* sp. (Loranthaceae)	Menoua (Fongo-Tongo)	CAM025a
Psylla s.I. sp.n.2	Unknown	Menoua (Foto-Meteu)	CAM025b
Psylla s.I. sp.n.3	*Tapinanthus ogowensis* (Loranthaceae)	Menoua (Dschang)	CAM025c
Cacopsylla sp.n.	*Pittosporum viridiflorum* (Pittosporaceae)	Menoua (Santchou)	CAM119
Acizzia sp.n.	*Albizia* cf. *adianthifolia* (Mimosaceae)	Menoua (Lingang)	CAM023
Palaeolinbergiella sp.n.1	*Dalbergia saxitilis* (Fabaceae)	Menoua (Santchou)	CAM123
Palaeolinbergiella sp.n.2	*Dalbergia grandibracteata* (Fabaceae)	Menoua (Foto-Nkop)	CAM125
Palaeolinbergiella sp.n.3	*Dalbergia grandibracteata* (Fabaceae)	Menoua (Foto-Nkop)	CAM124
Palaeolinbergiella sp.n.4	*Dalbergia albiflora* (Fabaceae)	Hauts-Plateaux (Bangam)	D68
Gen. sp.n.1	*Pygeum* sp. (Rosaceae)	Menoua (Dschang)	CAM029
Gen. sp.n.2	*Piliostigma thonningii* (Ceasalpinaceae)	Noun (Foumbot)	CAM057a
Gen. sp.n.3	Unknown	Menoua (Bansoa-Chefferie)	CAM057b
Gen. sp.n.4	*Psorospermum febrifugum* (Hypericaceae)	Hauts-Plateaux (Bamendjou)	CAM004
Gen. sp.n.5	Unknown	Menoua (Foto-Meteu)	D65

RESULTS

The findings revealed that 5704 Psyllidae of 7 sub-families of different developmental stages were captured of which 828 belong to sub-family Aphalaroidinae, 918 to Ciriacreminae, 703 to Diaphorininae, 606 to Paurocephalinae, 136 to Rhinocolinae, 528 to Spondyliaspidinae and 1985 to Psyllinae. Eleven hundred and fifty males, 1284 females and 3270 larvae were recorded. There is no information about the larvae of 10 species. Thirty seven species were collected during this survey (Table 2). Among these 37 species, *Blastopsylla occidentalis* and *Heteropsylla cubana* are knew and 35 other species unknown.

Psyllidae feed on different host plants of 16 families: Loranthaceae (2 species), Fabaceae (4 species), Ceasalpinaceae (2 species), Sterculiaceae (3 species), Euphorbiaceae (1 species), Hypericaceae (4 species), Connaraceae (1 species), Asteraceae (3 species), Celastraceae (1 species), Mimosaceae (5 species), Pittosporaceae (1 species), Rosaceae (1 species), Myrtaceae (2 species), Melianthaceae (1 species), Anacardiaceae (1 species), Urticaceae (1 species) and 6 unknown host plants.

Subfamily Aphalaroidinae Loginova
***Yangus* Genus**

- *Yangus* sp.n.1, psyllid of *Albizia adianthifolia* (Mimosaceae), (CAM064): 25 males, 20 females and 66 larvae, Lingang, 13 (I) 2006; 1 male and 4 females, Fossong, 14 (ii) 2006 ; 1 male, 7 females and 100 larvae, Lingang, 8 (iii) 2006 (JL Tamesse and VJ Dzokou) ; 1 male, 1 female and 17 larvae, Ndang, 4 (ii) 2006; 8 males, 6 females and 31 larvae, Fossong, 21 (iii) 2006; 1 male, 1 female and 9 larvae, Fossong, 11 (iv) 2006; 3 males, 11 females and 6 larvae, Kentsop, 12 (v) 2006; 2 males, 7 females and 47 larvae, Tsinfeum, 17 (ix) 2006; 7 males, 2 females and 22 larvae, Nkop, 21 (x) 2006 ; 18 males, 12 females and 21 larvae, Tsinkop, 15 (xi) 2006; 4 males, 6 females and 13 larvae, Nkop, 29 (xii) 2006; 1 male and 1 female, Nzem, 10 (i) 2007
- *Yangus* sp.n.2, psyllid of *Albizia* cf. *attissima* (Mimosaceae), (CAM027): 2 males and 4 females, Dedah, 1 (ii) 2006; 3 males, 11 females and 4 larvae, Fossong, 13 (ii) 2006; 100 males, 100 females and 150 larvae, Fossong, 14 (ii) 2006; 1 male, 17 females and 8 larvae, Fossong, 21 (iii) 2006; 1 male, 1 female and 5 larvae, Dedah, 11 (iv) 2006; 9 males, 7 females and 6 larvae, Denkop, 14 (vi) 2006 ; 3 males, 7 females and 6 larvae, Bafounda, 20 (vii) 2006; 1 male and 1 larvae, Dedah, 13 (ix) 2006; 2 males and 3 females, Dedah, 27 (ix) 2006; 1 male and 4 females, Leppe, 10 (iii) 2007; 1 male, 17 females and 8 larvae, Fossong, 21 (iii) 2006
- *Yangus* sp.n.3, psyllid of *Albizia zygia* (Mimosaceae), (CAM042): 21 males, 24 females and 16 larvae, Foumbot, 7 (iv) 2006 ; 9 males, 6 females and 2 larvae, Mango'o, 10 (vii) 2006; 7 males, 12 females and 5 larvae, 15 (xi) 2006; 1 male, 3 females and 4 larvae, Bangam, 3 (ii) 2007
- *Yangus* sp.n.4, psyllid of *Albizia glaberrima* (Mimosaceae), (CAM131): 3 males, 2 females and 1 larvae, Mbokou, 12 (x) 2006

Subfamily Ciriacreminae Enderlein
***Heteropsylla* Genus**

- *Heteropsylla cubana*, Psyllid of *Leucena glauca* (Mimosaceae) (CAM075): 9 males, 14 females and 27 larvae, Dschang-Ville, 13 (i) 2006; 10 males, 10 females and 102 larvae, Foreke, 12 (iii) 2006; 50 males, 58 females and 43 larvae, Foumbot, 7 (iv) 2006; 20 males, 21 females and 4 larvae, Foto, 14 (ix) 2006; 8 males, 8 females and 32 larvae, Tsinfeum, 21 (x) 2006; 500 larvae, Tsinfeum, 13 (xi) 2006

***Ciriacremum* Genus**

- *Ciriacremum* sp.n., host plant unknown (D73): 1 female, Foto-Chefferie, 15 (xi) 2006

***Kleiniella* Genus**

- *Kleiniella* sp.n. host plant unknown (D60): 1 female, Foto-Chefferie, 15 (xi) 2006

Subfamily Diaphorininae Vondracek
***Diaphorina* Genus**

- *Diaphorina* sp.n.1, psyllid of *Maytenus senegalensis* (Celastraceae) (CAM056): 7 males, 11 females and 1 larvae, Foumbot, 7 (iv) 2006 (JL Tamesse and VJ Dzokou); 1 male and 4 females, Foumbot, 26 (v) 2006
- *Diaphorina* sp.n.2, psyllid of *Vernonia amygdalina* and *Crassocephalum mannii* (Asteraceae) (CAM055a): 40 males, 38 females and 39 larvae, Tsinfeum, 11 (iv) 2006; 100 males, 100 females

and 70 larvae, Tsinfeum, 14 (iv) 2006; 1 male, 3 females and 7 larvae, Mboum, 8 (vi) 2006; 30 males, 21 females and 69 larvae, Tsinfeum, 14 (vi) 2006; 22 males, 23 females and 2 larvae, Nzem, 28 (ix) 2006; 4 males, 6 females and 33 larvae, Tsinfeum, 12 (x) 2006; 7 males, 12 females and 27 larvae, Tsinkop, 15 (xi) 2006; 3 males and 1 female, Fomopea, 13 I 2007

- *Diaphorina* sp.n.3, *Globimetula braunii* (Loranthaceae) (CAM117): 1 female, Nkop, 27 (iii) 2006; 2 females, Fossong, 31 (v) 2007
- *Diaphorina* sp.n.4, psyllid of *Microglossa angolensis* (Asteraceae) (CAM055b): 11 males, 7 females and 10 larvae, IRAD Bambui, 06 (xii) 2007

***Epipsylla* Genus**

- *Epipsylla* sp.n., host plant unknown (D44) : 1 female, Fossong, 18 (vi) 2006

Sub-family Paurocephalinae Bekker-Migdisova
***Paurocephala* Genus**

- *Paurocephala* sp.n.1, psyllid of *Dombeya ledermannii* (Sterculiaceae) (CAM020) : 25 males, 35 females and 6 larvae, Lingang, 30 (xi) 2005; 16 males and 23 females, Lingang, 27 (i) 2006; 1 male and 1 female, Dschang-Ville, 11 (ii) 2006; 19 males, 18 females and 2 larvae, Makong, 11 (v) 2006; 34 males, 28 females and 3 larvae, Foumbot, 26 (v) 2006; 9 males and 10 females, Bafounda, 20 (vii) 2006; 10 males and 13 females, Lingang, 27 (ix) 2006
- *Paurocephala* sp.n.2, psyllid of *Psorospermum* cf. *aurantiacum* (Hypericaceae) (CAM024): 2 males, 7 females and 5 larvae, Fonakeukeu, 1 (v) 2006; 1 male and 1 female, Mboum, 8 (vi) 2006; 2 males, 2 females and 6 larvae, Lingang, 16 (vi) 2006; 1 male, 3 females and 3 larvae, 6 (vii) 2006; 5 males, 8 females and 25 larvae, Fossong, 18 (viii) 2006; 7 males, 8 females and 17 larvae, Fossong, 13 (ix) 2006; 1 female, Mboum, 24 (vi) 2007
- *Paurocephala* sp.n.3, psyllid of *Cnestis ferruginae* (Connaraceae) (CAM146) : 29 males, 37 females and 60 larvae, Massagam, 21 (vii) 2006
- *Paurocephala* sp.n.4, psyllid of *Psorospermum* sp. (Hypericaceae) (CAM013): 1 male, 1 female and 1 larvae, Fonakeukeu, 1 (v) 2006; 1 male and 1 female, Banékané, 10 (vii) 2006; 2 females and 2 larvae, Fossong, 18 (viii) 2006; 1 female, Nzem, 10 (i) 2007
- *Paurocephala* sp.n.5, psyllid of *Psorospermum aurantiacum* (Hypericaceae) (CAM143): 7 males, 10 females and 14 larvae, Nzem, 10 (i) 2007

***Diclidolphlebia* Genus**

- *Diclidolphlebia* sp.n.1, psyllid of *Boehmeria platyphylla* (Urticaceae) (D55): 1 male and 14 larvae, Mbokou, 12 (x) 2006

Sub-Family Psyllinae Löw
***Psylla* Genus**

- *Psylla* s.I. sp.n.1, host plant unknown (CAM025a) : 2 females, Fossong, 5 (vi) 2006 ; 3 males and 1 female, Fossong, 13 (vi) 2006; 1 female, Fossong, 18 (iii) 2006; 7 males and 10 females, Fossong, 24 (i) 2007
- *Psylla* s.I. sp.n.2, host plant unknown (CAM025b): 33 males and 27 females, Nzem, 10 (i) 2007; 4 males and 4 females, Meteu, 10 (i) 2007
- *Psylla* s.I. sp. n.3, psyllid of *Tapinauthus ogowensis* (Loranthaceae) (CAM025c): 2 males and 2 females, Dschang-Ville, 12 (viii) 2007

***Cacopsylla* Genus**

- *Cacopsylla* sp.n., psyllid of *Pittosporum viridiflorum* (Pittosporaceae) (CAM119): 1 male, 1 female and 5 larvae, Dschang-Ville, 11 (ii) 2006; 5 males, 3 female and 8 larvae, Lingang, 15 (ii) 2006 ; 8 females and 7 larvae, Nkop, 22 (iii) 2006 ; 16 males and 12 females, Lingang, 27 (iii) 2006 ; 1 female, Mboum, 8 (x) 2006; 2 females and 9 larvae, Nkop, 21 (x) 2006; 8 males, 12 females and 18 larvae, Nkop, 29 (xii) 2006; 7 males, 1 female and 9 larvae, Meteu, 10 (i) 2007

***Acizzia* Genus**

- *Acizzia* sp.n., psyllid of *Albizia* cf *adianthifolia* (Mimosaceae), (CAM023): 8 males, 10 females and 4 larvae, Lingang, 8 (ii) 2006; 2 males and 1 larvae, Kentsop, 12 (iii) 2006; 19 males, 12 females and 14 larvae, Lingang, 21 (iii) 2006; 12 males, 10 females and 71 larvae, Nkop, 21 (iii) 2006 ; 1 female and 2 larvae, Lingang, 14 (iv) 2006; 7males, 12 females and 6 larvae, Nkop, 27 (iii) 2006; 5 males, 6 females and 4 larvae, Fongo-Tongo, 14 (iv) 2006; 1 male and 1 female, Fongo-Tongo, 18 (iv) 2006; 2 males, 5 females and 1 larvae, Makong, 11 (v) 2006; 7 males, 8 females and 2 larvae, Tsinkop, 15 (xi) 2006

***Palaeolinbergiella* Genus**

- *Palaeolinbergiella* sp.n.1, psyllid of *Dalbergia saxitilis* (Fabaceae) (CAM123): 7 larvae, Foreke, 11 (ii) 2006; 3 males, 1 female and 1 larvae, Nkop, 12 (ii) 2006
- *Palaeolinbergiella* sp.n.2, psyllid of *Dalbergia grandibracteata* (Fabaceae) (CAM125): 1male and 1 female, Nkop, 23 (iii) 2006; 17 males and 14 females, Nkop, 11 (v) 2006 ; 1 male, 1 female and 25 larvae, Nkop, 18 (viii) 2006; 3 males, 2 females and 22 larvae, Nkop, 21 (x) 2006
- *Palaeolinbergiella* sp.n.3, psyllid of *Dalbergia grandibracteata* (Fabaceae) (CAM124): 4 males, 1 female and 4 larvae, Nkop, 27 (iii) 2006
- *Palaeolinbergiella* sp.n.4, psyllid of *Dalbergia albiflora* (Fabaceae) (D68): 1 male, 2 females and 26 larvae, Bangam, 3 (ii) 2007
- gen. sp.n.1, psyllid of *Pygeum* sp.(Rosaceae) (CAM029): 4 males, 8 females and 2 larvae, Dschang-Ville, 13 (i) 2006; 16 males, 25 females and 18 larvae, Dschang-Ville, 23 (iii) 2006; 2 females and 6 larvae, Dschang-Ville, 16 (ix) 2006; 23 males, 16 females and 58 larvae, Dschang-Ville, 8 (xii) 2006
- gen. sp.n.2, psyllid of *Piliostigma thonningii* (Ceasalpinaceae) (CAM057a): 200 males, 200 females and 700 larvae, Foumbot, 7 (iv) 2006; 2 males, 1 female and 96 larvae, Banékané, 10 (vii) 2006; 8 males, 4 females and 1 larvae, Basse-Bamougoum, 20 (vii) 2006
- gen. sp.n.3, host plant unknown (CAM057b): 2 males, Bansoa-Chefferie, 3 (v) 2006.
- gen. sp.n.4, psyllid of *Psorospermum febrifugum* (Hypericaceae) (CAM004) : 3 males and 1 larvae, Mboum, 8 (vi) 2006; 13 males and 13 females, Mboum, 24 (vi) 2007; 2 males and 1 female, Mboum, 24 (vi) 2007
- gen. sp.n.5, host plant unknown (D65): 1 female, Meteu, 10 (i) 2007

Sub-Family Rhinocolinae Vondràcek
***Cerationotum* Genus**

- *Cerationotum* sp.n.1. cf. *bicorne*, psyllid of *Lannea* sp. (Anacardiaceae) (CAM059): 5 males, 13 females and 6 larvae, Foumbot, 7 (iv) 2006; 3 males, 1 female and 20 larvae, Foumbot, 26 (v) 2006; 2 males, 7 females and 3 larvae, Foumbot, 27 (vii) 2006

- *Cerationotum* sp.n.2. cf. *cuneipennis*, psyllid of *Lannea* sp. (Anacardiaceae) (CAM060): 3 males, 4 females and 11 larvae, Foumbot, 26 (v) 2006 ; 16 males, 17 females and 23 larvae, Foumbot, 27 (vii) 2006
- gen n. sp., *Bersama abyssinica* (Melianthaceae) (CAM001): 2 females, Massangam, 21 (vii) 2006

Sub-Family Spondyliaspidinae Heslop-Harrison
***Ctenarytaina* Genus**

- *Ctenarytaina* sp.n., psyllid of *Syzygium guineense* (Myrtaceae) (CAM058): 4 males, 5 females and 6 larvae, Mboum, 15 (iii) 2006; 26 males, 28 females and 80 larvae, Mboum, 19 (iii) 2006; 1 male, 3 females and 30 larvae, Mboum, 8 (vi) 2006

***Blastopsylla* Genus**

- *Blastopsylla occidentalis,* psyllid of *Eucalytus globulus* (Myrtaceae) (CAM061): 2 males, 3 females and 11 larvae, Nkop, 26 (iv) 2006; 14 males, 13 females and 123 larvae, Dschang-Ville, 1 (v) 2006; 1 male, 1 female and 2 larvae, Foto, 11 (v) 2006; 14 males, 5 females and 23 larvae, Bafounda, 20 (vii) 2006; 5 males, 13 females and 11 larvae, Nkop, 26 (iv) 2006; 14 males, 13 females and 22 larvae, Dschang-Ville, 17 (ix) 2006; 4 males, 4 females and 8 larvae, Nkop, 21 (x) 2006; 5 males, 8 females and 12 larvae, Dschang-Ville, 8 (xii) 2006; 7 males and 7 females, Nzem, 10 (i) 2007

DISCUSSION

Burckhard's (1987a) recognise among Psyllidae family, 16 sub-families all over the world. But in Cameroon, Tamesse (2005) recognise in Cameroon, 8 sub families, 14 genus and 25 differents species. During this survey in the western part of Cameroon, 7 sub-families of 37 species exist. Among 37 species, 35 are undescribed species.

The sub-family Aphalaroidinae is mentioned in Western province of Cameroon for the first time. It has one genus, *Yangus* (Fang, 1990). The single species described all over the world was collected on *Albizia procera* (Mimosaceae) in Taiwan (Fang, 1990). Tamesse (2005) announce the presence of 2 species of *Yangus* associated with *Albizia glaberrima* and *A. ferruginea* (Mimosaceae) in Soa (Yaounde) for the first time. This study confirm the presence in West- Cameroon of *Yangus* species associated with *A. glaberrima.* We also collected 3 other new species of *Yangus* feeding on Mimosaceae. This genus is very host specific on Mimosaceae.

According to Hollis (1976), the sub-family Ciriacreminae has 3 species of *Ciriacremum* (*C. nigeriense*, *C. nigripes*, *C. capillicorne*) and one species of *Kleiniella* (*K. jassina*) in Cameroon, without any information about their host plants. Three genus, *Heteropsylla cubana*, *Ciriacremum* sp. and *Kleiniella* sp. were collected during this study. Only one specimen of *Ciriacremum* and one specimen of *Kleiniella* were recorded in Western Cameroun. The 3 genus are colleted in West-Cameroon for the first time. *H. cubana* feeds on *Leucena glauca* (Mimosaceae) introduced in Cameroon by International Centre for Research in Agro forestry in 1980, in order to fertilize the soil. Before 1980, this psyllid did not exist in Cameroon.

The sub-family Diaphorininae has 2 genus, *Diaphorina* (4 new species) and *Epipsylla* sp.n. *Diaphorina* host plants are Celastraceae, Asteraceae and Loranthaceae in West- Cameroon. In South Africa, among the 28 *Diaphorina species* recorded, only *D. valens* was collected on *Maytenus oliodes* (Celastraceae) (Capener, 1970). Host plants of Psyllidae are very diverse.

Earlier field study in Cameroon permitted the description of Psyllids belonging to the sub-family Paurocephalinae: *Diclidophlebia xuani* Messi (Messi *et al*., 1998), associated with *Ricinodendron heudelotii* (Euphorbiaceae), *Diclidophlebia harrisoni* Osisanya (Osisanya, 1969), *Diclidophlebia eastopi* Vondracek (Vondracek, 1963) associated with *Triplochiton scleroxylon* (Sterculiaceae), *Diclidophlebia irvingiae* (Burckhardt *et al*., 2006b) associated with *Irvingia gabonensis* (Irvingiaceae) and *Diclidophlebia leptonychiae* (Burckhardt *et al*., 2006b) associated with *Leptonychiae* cf. *macrantha* (Sterculiaceae). In Western Cameroon, the subfamily Paurocephalinae has 2 genus, *Paurocephala* and *Diclidophlebia*. *Paurocephala* genus has 5 new species and *Diclidophlebia* genus has only one new species. The host plants of Paurocephalinae belong to 4 different families. According to Burckhardt *et al*. (2006b), *Diclidophlebia* species host plants are 7 families in 4 orders; the information on unpublished psyllids collections of different natural history museum, indicates that host plants of *Diclidophlebia* is even more diverse. Burckhardt and Misfud (2003), based on a cladistic analysis of 22 morphological characters (16 adult and 6 larval), raised the confusion which existed with the definition of the psyllid subfamily Paurocephalinae and the subfamily was redefined to comprise five genera.

The subfamily Psyllinae Löw is very rich of number of species. 4 genus, *Cacopsylla* sp.n., *Psylla* sp.n., *Palaeolinbergiella* sp.n. and *Acizzia* sp.n. are knew in the region. Five genus are to define. *Acizzia* sp.n (Psyllinae) and *Yangus* sp.n.1 (Aphalaroidinae) feed on the same host, *Albizia* cf. *adianthifolia* (Mimosaceae) in Western Cameroon, without any segregation for the nutrition and nymphal stages sites.

The subfamily Rhinocolinae has 2 new species of *Cerationotum* feed on *Lannea* sp. (Anacardiaceae) and a new genus associated with *Bersama abyssinica* (Melianthaceae). *Cerationotum* genus is collected for the first time in Western Cameroon.

The subfamily Spondyliaspidinae has 2 genus, *Ctenarytaina* sp.n, psyllid of *Syzygium guineense* (Myrtaceae) and *Blastopsylla occidentalis*. *B. occidentalis*, very well known in the old world (Brennan *et al*., 2001), is collected on *Eucaluptus globulus* in West Cameroon for the first time. In South Africa, *Ctenarytaina eucalypti* Maskell, feeds also on *E. globulus* (Myrtaceae) (Capener, 1970). This remark shows that, in some conditions, the two species, *Ctenarytaina* and *Blastopsylla* can feed on the same host plant. Now, in West Cameroon, *Ctenarytaina* sp.n. is more dangerous than *Blastopsylla occidentalis*, according to damages.

Ciriacremum nigeriense, *C. nigripes*, *C. capillicorne*, *Kleiniella jassina*, *Diclidophlebia harrisoni*, *D. eastopi D. irvingiae, D. leptonychiae* and *D. xuani* knew before from Cameroon were not captured during this survey in the Western Province.

Psyllidae host plants belong to 17 different families: Anacardiaceae, Asteraceae, Ceasalpinaceae, Celastraceae, Connaraceae, Fabaceae, Hypericaceae, Loranthaceae, Melianthaceae, Mimosaceae, Myrtaceae, Pittosporaceae, Rosaceae, Sterculiaceae, Euphorbiaceae and Urticaceae. Nine host plants are still unknown. Some host are rich with species, Mimosaceae (5 species), Fabaceae (4 species) and Hypericaceae (4 species). Loranthaceae family is known as host of psyllid in afrotropical region for the first time. *Globimetula braunii* (Loranthaceae) growth on *Ficus platyphylla* (Moraceae) and *Tapinanthus ogowensis* (Loranthaceae) on Coniferale. Considering the list of family host of 36 Psyllidae species from South Africa, cited by Capener (1970), only 4 families are Psyllidae host plants in West-Cameroon (Celastraceae, Anacardiaceae, Myrtaceae and Euphorbiaceae). Twelve other families host plants from West Cameroon are different of those from South Africa. Psyllidae host are very diverse in West Cameroon and some have various economical and pharmaceutical importance. *Eucalyptus* sp. is used as wood for industries and as post for transporting electric cord in Cameroon. *Bersama abyssinica* (Melianthaceae) produces a hard, heavy wood that is used for the construction of houses in West Africa (Heywood, 1993). *Vernonia amygdalina* (Asteraceae) is used in Nigerian for folk medicine as a tonic and remedy against constipation, fever, high blood pressure and many

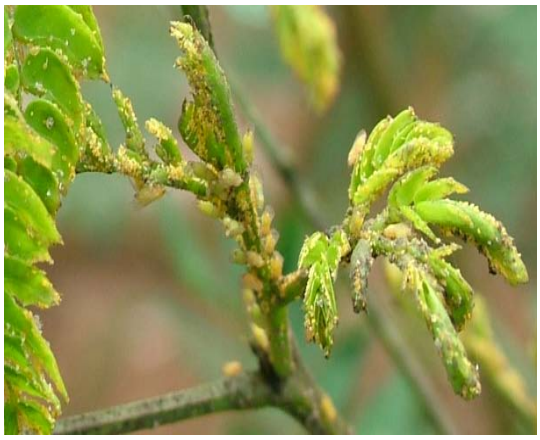

Fig. 1: *Leucena glauca* (Mimosaceae) with adults and larvae showing mould and necrosis

Fig. 2: *Vernonia amygdalina* with larvae and adults of *Diaphorina* sp.n.2, associated with ants

infectious diseases (Iwalokun *et al*., 2006). It's elicited hepatoprotectivity through antioxidant activity on acetaminophen- induced hepatic damage in mice (Iwalokun *et al*., 2006). Leaves of *V. amygdalina* are used as vegetable in Central Africa. Extracts of *Cnestis ferruginae* (Connaraceae) showed a great activity against *Aspergillus niger*, pathogen agent of human aspergillums (Le Grand *et al*., 1988). Psyllidae caused severe damages on their host plants. The sap feeding activity on host plant caused a stress to the plant; the injection of toxins to the plant tissues provokes the degeneration of leaves, buds or the whole plant; the distortion of leaves, the apparition of necrosis on leaves and stems occurred during larval development.

Heteropsylla cubana feed and laid their eggs preferentially on the youngest buds (Fig. 1). In the period of higher proliferation, adults and larvae lay all the surface of buds and youngest leaves. Adults and larvae of *Diaphorina* sp.n.2 feed and laid their eggs at the lower side of the leaves of *Vernonia amygdalina* (Asteraceae) (Fig. 2). This psyllid is associated with ants probably in search for secretes by larvae. Leaves are very deformed (Fig. 3) as it is the case of the leaves of *Pittosporum viridiflorum* (Pittosporaceae) (Fig. 4), host plant of *Cacopsylla* sp.n. In the nursery, the uncovered young plants of *Pygeum* sp. (Rosaceae) has their leaves puffed, deformed and sometimes

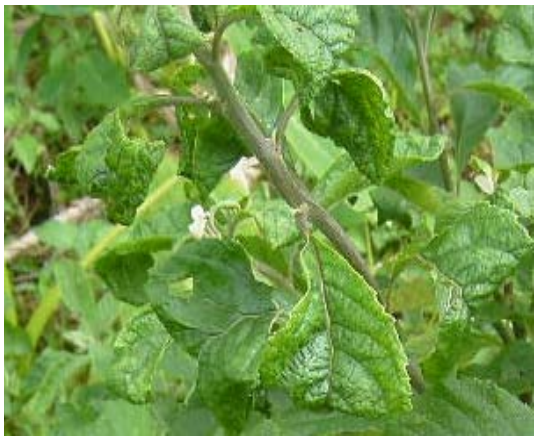

Fig. 3: *Vernonia amygdalina* with leaves deformation by *Diaphorina* sp.n.2

Fig. 4: *Pittosporum viridiflorum* (Pittosporaceae) with leaves deformation, rolled up and sheltering the larvae of Psyllinae gen.sp.n.2

wrapped (Fig. 5). These youngest *Pygeum* plants were weak and unfit for commercialisation. Leaves of *Syzygium guineense* (Myrtaceae), host of *Ctenarytaina* sp.n. are deformed and sometimes, young leaves and buds remain dwarfs after the period of higher proliferation (Fig. 6). On young plants of *Eucalyptus globulus* (Myrtaceae), the attack lessened considerably, but the old leaves present strong discolourations (Fig. 7). The larvae of *Diclidophlebia* sp.n.2. form often dense colonies and feed on young leaves of *Psorospermum aurantiacum* (Hypericaceae) (Fig. 8); on *Boehmeria platyphylla* (Urticaceae), larvae of *Diclidophlebia* sp.n. feed also on flowers or fruits as well as terminal buds (Fig. 9). It is the case of *Diaphorina* sp.n.4 on *Microglossa angolensis* (Asteraceae) (Fig. 10). This type of damages is similar to those caused by *Diclidophlebia smithi* in Brazil (Burckhardt *et al*., 2006a) on *Miconia calvescens* (Melastomataceae). The populations of Psyllinae gen.sp.n.2 feed on the upper side of the young leaves of *Piliostigma thoningii* (Ceasalpinaceae). These leaves are twisted, deformed, covered by mould and necrosis (Fig. 11). Adults and larvae are also associated with ants. Other Psyllidae did not provoke visual damages on their host plants; it is the case of *Palaeolinbergiella* sp.n.2

Fig. 5: Young plants of *Pygeum* sp. already attacked by Psyllinae gen.sp.n.1

Fig. 6: *Syzygium guineense* (Myrtaceae), with wax filaments in terminal buds produce by the larvae of *Ctenarytaina* sp.n.

Fig. 7: Leaves of *Eucalytus globulus* (Myrtaceae) discoloured by *Blastopsylla occidentalis*

Fig. 8: *Psorospermum aurantiacum* Engl. (Hypericaceae) with leaves deformation by *Pauropsylla* sp.n.5

Fig. 9: *Boehmeria platyphylla* (Urticaceae), host of *Diclidolphlebia* sp.n.

Fig. 10: Adults and larvae of *Diaphorina* sp.n.4 feed on young leaves and infrutescence of *Microglossa angolensis* (Asteraceae)

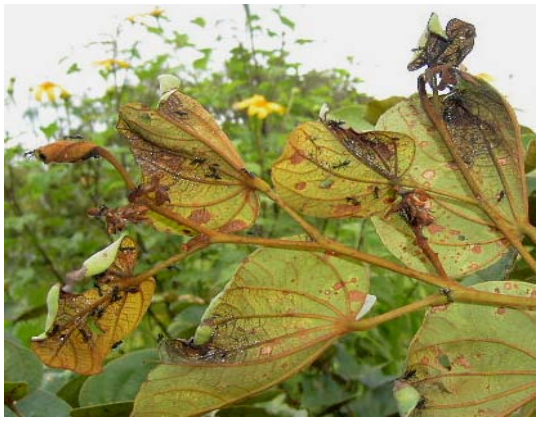

Fig. 11: Piliostigma *thonningii* (Ceasalpinaceae) with twisted leaves, covered by mould and necrosis

Fig. 12: *Dalbergia grandibracteata* (Fabaceae), host of *Palaeolinbergiella* sp.n.with no visual damage

Fig. 13: *Tapinauthus ogowensis* (Loranthaceae), host of *Psylla* sp.n.3 with no visual damages

Fig. 14: *Maytenus senegalensis* (Celastraceae), host of *Diaphorina* sp.n.2

and *Palaeolinbergiella* sp.n.3 on *Dalbergia grandibracteata* (Fabaceae) (Fig. 12), *Psylla* sp.n.3 on *Tapinauthus ogowensis* (Loranthaceae) (Fig. 13) and *Diaphorina* sp.n.1 on *Maytenus senegalensis* (Celastraceae) (Fig. 14).

CONCLUSION

In West Cameroon, 37 species of psyllids of Psyllidae family were recorded in 7 subfamilies: Aphalaroidinae (one genus), Ciriacreminae (3 genus), Diaphorininae (2 genus), Paurocephalinae (2 genus), Rhinocolinae (3 genus), Spondyliaspidinae (2 genus) and Psyllinae (9 genus). Among these 37 species, 35 are undescribed species and the 2 other species earlier described elsewhere but unknown from Western Cameroon. Nine species previously described from Cameroon were not captured during this study. Psyllidae host plants are diverse with various economical and pharmaceutical importances. Damages caused by these insects on their host plants are mainly deformation and distortion of leaves, mould and necrosis. In order to undertake an integrated pest management against species with an economic and pharmaceutical interests, it will be important to pursue these works notably by completing the taxonomy and biology studies of psyllids of Psyllidae family in Western Cameroon.

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