Biodiversity of Jumping Plant-lice of the Psyllidae Family (Hemiptera: Psylloidea) from the South Region of Cameroon: Faunistics, Phenology and Host Plants

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ABSTRACT

The psyllids of Psyllidae family are known from the West and the Center regions of Cameroon. None is published in the South region of this country. From January 2006 to December 2007, the prospectuses undertaken in the south region of Cameroon permitted to investigate the biodiversity of psyllids of the Psyllidae family. Psyllids were collected in different localities in south region on various host plants. Adult psyllids were captured with a sweep net of 0.5 mm mesh size and an aspirator. Larvae were sampled directly from buds and leaves of the host plant. All specimens were preserved in 70% ethanol. This study documented 35 species belonging to 16 genera and 6 subfamilies: Aphalaroidinae with Yangus genus (5 species); Ciriacremina with 3 genera, Heteropsylla (1 specie), Ciriacreumen (4 species) and Kleiniella (1 species); Diaphorinae with 2 genera, Diaphorina (1 specie) and Epipsylla (2 species); Euphalerinae with 5 genera, Colophorina (1 specie), Euryconus (1 specie) and 3 new genera with have respectively 1 specie; Paurocephalinae with 3 genera, Paurocephala (3 species), Dioliophlebia (6 species) and Syntomoza (1 specie); Psyllinae/Arytaininae with 2 genera, Palaecombergiella (2 species) and a new genus with 1 specie. Four genera remain undescribed. All those psyllids were collected in 15 different localities of the South Region of Cameroon. Three species (Ciriacreumen sp.2, Kleiniella sp. 4 and Paurocephala sp. 3) were collected in the South region of Cameroon. Any of these species weren’t recorded in the Center and west region of Cameroon. The phenology of the host plants permit us to justify the proliferation period of each species. Host plants belong to 7 families; the Fabaceae constitutes the family with the largest number of associated psyllid species. The damage caused by the psyllids on their host plants were recorded and photographed. The present survey permitted to enrich the biodiversity of the psyllids of the Psyllidae family of Cameroon.

Key words: Aphalaroidinae, ciriacremina, diaphorinae, euphalerinae, paurocephalinae, psyllinae/arytaininae, host plants, South-Cameroon

INTRODUCTION

Cameroon is situated in central Africa between latitudes 2° and 13° North and longitudes 9° and 16° East with a surface area of 475,000 km². The South region is one of the ten administrative
regions of Cameroon; this region is situated between latitudes 2°12' (Olamze) and 3°26' (Bengbis) North and longitudes 9°50' (Campo) and 13°18’ (Mintom II) East with a surface area of 47,191 km²; its has 4 divisions: Dja and Lobo, Mbilla, Ocean, Valley of Ntem. The South Cameroon plateau cross this region. The climate is equatorial of Guinean type with four seasons: two rainy seasons (August-November; March-July) and two dry seasons (November-March; July-August); the precipitations are abundant, between 1500-2000 mm water year⁻¹; the temperature is high but be constant at the average of 25°C. This particular climate influences the vegetation of this region, mainly characterise by a tropical humid thick forest (Suchel, 1988).

Jumping plant-lice or psyllids (Hemiptera, Psyllidea), are plant sap-sucking insects which are predominantly associated with dicotyledons (Hodkinson, 1974; Burekhardt, 1987; Brown and Hodkinson, 1988). Some psyllids are narrowly associated to specific host plants family (Burekhardt et al., 2004). When psyllid population is high, serious damage caused by larvae or adults psyllids can transmit plant diseases (Burekhardt, 2005; Tamesse, 2005). Damage caused by psyllids are numerous: deformations of leaves, buds or flowers including formation of galls, discolouration and necrosis of leaves, flowers or fruits; larvae secreted honeydew which stimulates fungal growth on plant organs.

The inventory of local fauna, particular in Afrotropical region, constituted an important data in conservation and sustainable use of the biodiversity. In various groups, particular those rich in number of species like insects, only a little proportion of species is described; currently 3000-3500 psyllid species are described, this may represent less than half the number of existing species. More taxonomic literature was done, but these studies are important in temperate and subtropical regions. For Afrotropical region, they are few important biodiversity and taxonomic studies: Vondracek (1963) on jumping plant-lice from Central Africa (Congo); Capener (1968, 1970, 1973) on the Psyllidae from South Africa; Hollis (1976, 1984) on Jumping plant-lice of Ethiopia region and Afrotropical region; Burekhardt and Misful (2003), Burekhardt et al. (2005) on the Diclidophlebia genus from Afrotropical region; Alene et al. (2007) on Ciriacreminae from Gabon and Malenovsky and Burekhardt (2009) on Afrotropical Jumping plant-lice of Phaecopteridae.

In Cameroon particularly, few studies are done: Messi and Nguefong (1995) on a new specie, Mesohomotoma hollisi, recorded on Scaphopetalum Blackii, Messi et al. (1998a, 1998b) on a new specie, Diclidophlebia xuani, recorded on Ricinodendron heudolitii, Tamesse (2005) on the biodiversity, taxonomy and biology of psyllids of Cameroon, Tamesse et al. (2007) on Jumping plant-lice of Triozidae family, Malenovsky et al. (2007) on Jumping plant-lice of Phaecopteridae family, Dzokou et al. (2009) recognised 37 species, 22 genera and 7 subfamilies of psyllidae in West region of Cameroon, Yana et al. (2009, 2010) recognised 45 species, 24 genera and 7 subfamilies of psyllidae in Center region of Cameroon. Within the Psyllidae family, any study have been recorded in South region of Cameroon, which have characteristic flora different for the others regions.

In this study, we report the results from the survey from the South region of Cameroon with respect to the Psyllidae family as defined by Burekhardt (1987, 2005).

**MATERIALS AND METHODS**

From January 2006 to December 2007, psyllids were collected in 15 different localities of the South Region of Cameroon. This region comprised four divisions; altitudes and geographical coordinates of all localities where psyllids were collected are included in Table 1. Two localities were chosen for regular monthly prospections: Nkoenmvoie and Nkolandom. Additional localities were
Table 1: List of localities in South region of Cameroon, where psyllids were collected with altitudes and geographical coordinates

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Subdivisions</th>
<th>Localities</th>
<th>Altitudes (m)</th>
<th>Latitude (N)</th>
<th>Longitude (E)</th>
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<tr>
<td>Mvila</td>
<td>Ebolowa</td>
<td>Ebolowa</td>
<td>683</td>
<td>2°56′</td>
<td>11°09′</td>
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<td></td>
<td>Nkaeve</td>
<td>Nkoevone</td>
<td>683</td>
<td>2°56′</td>
<td>11°09′</td>
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<tr>
<td></td>
<td>Ngholom</td>
<td>Ngolomom</td>
<td>683</td>
<td>2°56′</td>
<td>11°09′</td>
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<td></td>
<td>Ngallan</td>
<td>Ngallan</td>
<td>683</td>
<td>2°56′</td>
<td>11°09′</td>
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<tr>
<td>Ngoulemakong</td>
<td>Ngoulemakong</td>
<td>Ngoulemakong</td>
<td>790</td>
<td>3°06′</td>
<td>11°25′</td>
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<tr>
<td>Dja et Lobe</td>
<td>Meyoumesala</td>
<td>Nvoumesa</td>
<td>688</td>
<td>3°06′</td>
<td>12°15′</td>
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<td></td>
<td>Sangmelima</td>
<td>Sangmelima</td>
<td>704</td>
<td>2°56′</td>
<td>11°59′</td>
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<td></td>
<td>Zoetele</td>
<td>Zoetele</td>
<td>691</td>
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<td>Lolodorf</td>
<td>457</td>
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<td>10°43′</td>
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<td></td>
<td>Madong</td>
<td>Madong</td>
<td>606</td>
<td>3°17′</td>
<td>10°46′</td>
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<td></td>
<td>Bikoka</td>
<td>Bikoka</td>
<td>457</td>
<td>3°14′</td>
<td>10°43′</td>
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<td></td>
<td>Bipindi</td>
<td>Bipindi</td>
<td>79</td>
<td>3°04′</td>
<td>10°24′</td>
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<tr>
<td></td>
<td>Bipouka</td>
<td>Bipouka</td>
<td>289</td>
<td>3°07′</td>
<td>10°31′</td>
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<td></td>
<td>Makoure</td>
<td>Makoure</td>
<td>49</td>
<td>3°03′</td>
<td>10°08′</td>
</tr>
<tr>
<td>Vallee du Ntem</td>
<td>Ambam</td>
<td>Ambam</td>
<td>565</td>
<td>2°23′</td>
<td>11°16′</td>
</tr>
</tbody>
</table>

visited occasionally. The method used in this study is the same method used by Dzokou et al. (2009) and Yana et al. (2010).

Adult psyllids were captured with a sweep net of 0.5 mm mesh size and an aspirator. Larvae were sampled directly from buds and leaves of the host plant. All specimens were preserved in 70% ethanol. The damage caused by the psyllids on the host plants was recorded and photographed. Specimens of the host plant were taken for identification by botanists of the University of Yaounde I and the National Herbarium in Yaounde.

At the Laboratory of Zoology of the Higher Teacher's Training College of the University of Yaounde I, were parts of the material is preserved, the insects were examined under a stereomicroscope, sorted to species and provisionally identified using psyllid identification keys. Representatives of most species were examined at the Naturhistorisches Museum Basel, Switzerland, were detailed taxonomic studies were done. A collection of dry and slide mounted specimens as well as material preserved in 70% ethanol is preserved in this institution.

RESULTS

During the survey 4813 specimens (1306 males, 2146, females and 1361 larvae) of Psyllidae were captured representing 6 subfamilies, 16 genera and 35 species. Host plants of 34 psyllid species could be recorded; only one plant specie remains unknown.

Subfamily aphalaridinae loginova 1964

Genus Yangus Fang 1990: Yangus sp.1 (host plant: Albizia adiantifolia, Fabaceae): Nkoevone: 27 i 2006, 3 males, 4 females, 3 larvae; 28 i 2006, 2 males, 1 female, 4 larvae; 18 ii 2006, 1 male, 4 females, 1 larva; 23 iii 2006, 2 males, 6 females, 12 larvae; 26 v 2006, 7 males, 10 females, 11 larvae; 23 vi 2006, 8 males, 16 females, 22 larvae; 21 ix 2006, 1 male, 3 females; 14 xii 2006, 1 male, 2 females; 24 iii 2007, 2 males, 8 females, 10 larvae; 24 iv 2007, 6 males, 9 females, 5 larvae; 29 vii 2007, 1 male, 1 female; 25 vii 2007, 3 males, 5 females, 4 larvae; 17 viii 2007, 1 male, 8 females, 2 larvae; 25 x 2007, 3 males, 12 females, 14 larvae. Ngoulemakong: 2 vi 2006, 2 males, 1 larva; 15 viii 2006, 7 males, 15 females, 20 larvae; 30 iii 2007, 3 males, 6 females, 1 larva. Ngallan: 25 xii 2006, 3 males, 4 females, 4 larvae; 27 i 2007, 1 male, 4 females. Nkolomom;
23 vii 2006, 4 males, 6 females; 21 x 2006, 3 males, 6 females, 3 larvae; 30 viii 2007, 4 males, 8 females. Madong: 08 ix 2007, 2 males, 5 females, 4 larvae.


Yangus sp. 3 (host plant: Albizia glaberrima, Fabaceae): Zoetele: 29 iii 2007, 3 males, 12 females; 22 vi 2007, 7 males, 8 females, 3 larvae. Bikoko: 08 ix 2007, 10 males, 17 females, 7 larvae. Nkoemvone: 16 iii 2006, 2 males, 4 females, 6 larvae; 20 iv 2006, 1 male, 3 females, 1 larva; 25 vi 2006, 2 females; 21 vi 2006, 4 females, 1 larva; 20 vii 2006, 2 males, 3 females; 28 ix 2006, 3 males, 8 females, 14 larvae; 26 x 2006, 1 male, 4 females; 16 xi 2006, 3 males, 5 females; 27 i 2007, 1 male, 3 females; 29 iii 2007, 2 males, 3 females.


Yangus sp. 5 (host plant: Albizia ferruginea, Fabaceae): Lolodof: 08 ix 2007, 9 males, 14 females, 7 larvae; Nkoemvone: 28 i 2006, 1 male, 3 female; 28 iii 2006, 2 females; 21 iv 2006, 2 males, 5 females, 10 larvae; 22 vi 2006, 3 males, 4 females; 25 ix 2006, 8 male, 14 females, 21 larvae; 15 xi 2006, 5 males, 11 females, 6 larvae; 28 i 2007, 2 females; 22 vi 2007, 4 males, 6 females, 3 larvae; 29 vi 2007, 1 male, 3 females.

Subfamily ciriacreminae enderlein 1960


Genus Ciriacremum enderlein 1960: Ciriacremum nigerense Hollis (host plant: Hyloendron gabunense, Fabaceae): Nkolandom: 28 i 2006, 3 males, 7 females, 6 larvae; 30 iii 2006, 7 males, 14 females, 6 larvae; 21 iv 2006, 2 males, 5 females, 1 larva; 24 vi 2006, 3 males, 8 females, 4 larvae; 23 vi 2006, 7 males, 10 females, 7 larvae; 27 vii 2006, 5 males, 9 females, 6 larvae; 26 ix 2006, 4 males, 10 females, 9 larvae; 24 x 2006, 4 male, 7 females, 6 larvae; 23 xi 2006, 2 males, 4 females, 4 larvae; 15 xii 2006, 5 female, 2 larvae; 27 i 2007, 3 females, 1 larva; 27 ii 2007, 3 males, 4 females, 3 larvae; 28 iii 2007, 5 males, 12 females; 23 iv 2007, 9 males, 12 females, 6 larvae; 21 vii 2007, 7 males, 10 females, 6 larvae; 23 ix 2007, 3 males, 3 females, 2 larvae; 26 x 2007, 1 male, 4 females, 1 larva; 16 xii 2007, 2 males. Nkoemvone: 27 vii 2006, 2 males, 3 females, 1 larva; 26 ix 2006, 7 females, 2 larvae; 23 xi 2006, 2 males, 3 females; 27 i 2007, 1 male, 2 females; 28 iii 2007, 2 males, 4 females, 2 larvae; 21 vii 2007, 6 males, 12 females, 3 larvae. Sangmelima: 28 iii 2007, 3 males, 3 females, 2 larvae. Ambam: 27 vi 2006, 6 males, 4 females, 4 larvae.

*Ciriacreum* sp. 2 (host plant: *Hymenostegia felicis*, Fabaceae): Nkoemvone: 30 iii 2007, 2 males, 3 females, 2 larvae; 22 iv 2007, 7 males, 10 females, 5 larvae; 05 v 2007, 12 males, 15 females; 10 larvae; 27 vi 2007, 2 males, 4 females, 4 larvae; 26 vi 2007, 4 males, 3 females, 3 larvae; 24 viii 2007, 3 males, 4 females, 3 larvae; 22 ix 2007, 1 male, 2 females, 1 larva; 26 x 2007, 6 males, 9 females, 4 larvae; 12 xii 2007, 3 males, 5 females, 2 larvae; Nkolandom: 27 vii 2007, 2 males, 2 females, 2 larvae; 24 viii 2007, 1 male, 2 females, 2 larvae; 23 ix 2007, 4 males, 5 females, 2 larvae; 27 x 2007, 3 males, 8 females, 3 larvae; 13 xii 2007, 2 males, 3 females, 2 larvae.


*Kleiniella* sp. 4 (host plant: *Hymenostegia felicis*, Fabaceae): Nkoemvone: 30 iii 2007, 5 males, 8 females, 5 larvae; 22 iv 2007, 9 males, 14 females, 9 larvae; 05 v 2007, 15 males, 17 females; 9 larvae; 27 vi 2007, 4 males, 6 females, 3 larvae; 26 vi 2007, 5 males, 4 females, 2 larvae; 24 vii 2007, 3 males, 5 females, 2 larvae; 22 ix 2007, 2 males, 2 females; 26 x 2007, 10 males, 18 females, 12 larvae; 12 xii 2007, 5 males, 8 females, 4 larvae; Nkolandom: 27 vii 2007, 3 males, 3 females, 1 larva; 24 viii 2007, 2 males, 3 females, 3 larvae; 23 ix 2007, 4 males, 6 females, 4 larvae; 27 x 2007, 9 males, 12 females, 8 larvae; 13 xii 2007, 2 males, 5 females, 3 larvae.

**Subfamily diaphorininae vondracek 1957**


*Epipsylla* sp. 2 (host plant: *Baphioptus* sp., Fabaceae): Nkoemvone: 26 v 2007, 1 male, 2 females.
Subfamily eupholerinae becker-migdisova 1973


Subfamily paurocephalinae vondracek (1968)
Genus Paurocephala crawford 1914: Paurocephala sp. 1 (host plant: Cnestis ferruginea, Connaraceae): Nkolomand: 22 iv 2006, 7 males, 12 females, 6 larvae; 26 v 2006, 5 males, 9 females, 5 larvae; 24 vi 2006, 4 males, 4 females, 3 larvae; 27 viii 2006, 2 males, 3 females, 1 larva; 27 ix 2006, 2 males, 3 females; 25 x 2006, 3 males, 6 females, 2 larvae; 27 i 2007, 2 males, 3 female, 2 larvae; 28 ii 2007, 3 males, 4 females, 3 larvae; 25 iii 2007, 4 males, 6 females; 27 iv 2007, 7 males, 12 females, 9 larvae; 23 v 2007, 3 males, 4 females, 1 larva; 25 vi 2007, 2 males, 6 females, 3 larvae; 27 x 2007, 1 male, 2 females, 4 larvae; 28 ii 2007, 6 males, 9 females, 10 larvae; 16 xii 2007, 1 male, 3 females. Bipindi: 10 ix 2007, 7 males, 10 females, 12 larvae. Nkoemvone: 24 vi 2006, 5 males, 7 females, 4 larvae; 24 iv 2006, 3 males, 5 females; 23 i 2007, 3 males, 4 females, 2 larvae; 28 v 2007, 7 males, 14 females, 7 larvae. Ambam: 27 vi 2006, 2 males, 2 females, 3 larvae.

Paurocephala sp. 2 (host plant: Agelaea hirsuta, Conaraceae): Nkoemvone: 05 v 2007, 5 males, 8 females, 3 larvae; 27 vii 2007, 2 males, 2 females, 1 larva; 28 ix 2007, 1 male, 2 females; 23 x 2007, 2 males, 5 females, 2 larvae; 17 xii 2007, 1 male, 1 female. Bijouka: 10 ix 2007, 3 males, 5 females, 1 larva.
Paurocephala sp. 3 (host plant unknown): Nkoemvone: 26 v 2006, 2 males, 4 females; 28 vii 2006, 1 male, 2 females; 25 x 2006, 2 females.


Diclidophlebia xuani Messi. 1998 (host plant: Ricinodendron heudelotii, Euphorbiaceae): Nkoemvone: 27 x 2006, 2 males, 3 females; 26 xi 2006, 4 males, 5 females, 2 larvae; 16 xii 2006, 1 male, 2 females, 2 larvae; 24 ii 2007, 7 males, 8 females, 4 larvae; 25 iii 2007, 7 males, 8 females, 16 larvae; 26 iv 2007, 7 males, 12 females, 10 larvae; 27 vii 2007, 2 males, 1 female, 4 larvae; 26 ix 2007, 1 male, 2 females, 1 larva. Nkolandom: 26 iv 2007, 3 males, 7 females, 8 larvae; 26 vii 2007, 3 males, 4 females, 3 larvae; 28 viii 2007, 2 males, 3 females; 25 ix 2007, 3 females; 24 x 2007, 1 male, 1 female.


Diclidophlebia sp. (host plant: Urena lobata, Fabaceae): Nkoemvone: 05 v 2007, 7 males, 10 females, 2 larvae; 24 vi 2007, 3 males, 7 females, 2 larvae; 27 vii 2007, 2 males, 5 females; 27 ix 2007, 1 male, 1 female; 29 x 2007, 3 males, 6 females; 26 xi 2007, 1 male, 4 females. Bijouka: 10 ix 2007, 6 males, 12 females.


Subfamily psyllinae/arytaininae crawford 1879


Palaeolindbergiella sp. 2 (host plant: Dalbergia sp, Fabaceae): Nkoemvone: 28 vii 2007, 2 males, 5 females, 3 larvae; 25 viii 2007, 2 males, 3 females; 28 x 2007, 7 males, 8 females, 5 larvae.

Gen. sp. (host plant: Anthonotha macrophylla, Fabaceae): Bijouka: 10 xii 2007, 15 larvae; Makoure: 27 xii 2007, 3 males, 5 females.
DISCUSSION

Faunistics: From January 2006 to December 2007, a survey in the South Region of Cameroon permitted to collect 35 species of Psyllidae. They belong to the following 6 subfamilies: Aphalaroidae (1 genus, 5 species), Ciriacremum (3 genera, 9 species), Diaphorinae (2 genera, 3 species), Euphalera (5 genera, 5 species), Paurocephalinae (3 genera, 10 species) and Psyllinae/Lyrieninae (2 genera, 3 species). The biodiversity of psyllids of Psyllidae family recovered in the south region of Cameroon was in contrast with what previous works showed in Cameroon. But some species collected in this region were also collected by previous researchers in the West and Center regions of Cameroon. Tamesse (2005) listed 26 species of Psyllidae from the entire territory of Cameroon; Dzokou et al. (2009) and Yana et al. (2010) listed respectively 37 and 45 species of Psyllidae in West and Center region of Cameroon. Thirty one psyllids species of Psyllidae family recorded in the Center region of Cameroon (Yana et al., 2010), were collected during this study in South region of Cameroon. These species are: Yangus sp. 3; Yangus sp. 4; Yangus sp. 5; Heteropsylla cubana; Ciriacremum nigeriense; Ciriacremum sp. 1; Ciriacremum sp. 3; Kleiniella sp. 1; Kleiniella sp. 2; Kleiniella sp. 3; Diaphorina sp.; Epipsylla sp. 1; Epipsylla sp. 2; Colophorina sp.; Euryconus sp.; Gen. sp. 1; Gen. sp. 2; Gen. sp. 3; Paurocephala sp. 1; Paurocephala sp. 2; Diclidophlebia eastopi; Diclidophlebia harrisoni; Diclidophlebia xuan; Diclidophlebia irvingiae; Diclidophlebia leptonychia; Diclidophlebia sp.; Syntomoza sp.; Palaeolindbergiella sp.1; Palaeolindbergiella sp.2 and Gen. sp. The common species were very high; this can be explained by the similar climate and vegetation we have in the Center and South regions; the population of Ciriacremum nigeriense and Ciriacremum sp. 1 was more important in South region than in the Center region; some species were less important in density compare to what we recorded in the Center region: Yangus sp. 4; Ciriacremum sp. 3; Kleiniella sp. 2; Epipsylla sp. 1; Epipsylla sp. 2 and Paurocephala sp. 2. Fourth species recorded in the South region: Yangus sp. 2; Ciriacremum sp. 2; Kleiniella sp. 4 and Paurocephala sp. 3 were not collected in the Center region.

Nine psyllids species of Psyllidae family recorded in the West region of Cameroon (Dzokou et al., 2009), were collected during this study in South region of Cameroon. These species are: Yangus sp. 1; Yangus sp. 2; Yangus sp. 3; Yangus sp. 4; Heteropsylla cubana; Diaphorina sp.; Paurocephala sp. 1; Palaeolindbergiella sp.1 and Palaeolindbergiella sp.2. Some important difference between climate and vegetation in this two regions, can explain this result; all those species have more representative effective in South region except Diaphorina sp. Twenty six species recorded here were not observed in the Western region according to Dzokou et al. (2009).

Three psyllids species of Psyllidae family were collected in the South region of Cameroon. Any of these species weren't recorded in the Center and west region of Cameroon. These species are: Ciriacremum sp.2, Kleiniella sp. 4 collected in host plant, Hymenostegia felis and Paurocephala sp. 3. Hymenostegia felis can be a host plant which is endemic of certain localities of the south region.

One species is exotic pest which recently have been introduced into Cameroon: Heteropsylla cubana develops on Leucaena spp. Both are pests on their hosts and have been reported also from elsewhere in Africa.

Seven species were common being collected at least Twenty times: Euphaleriae Gen. sp. 1 (30 times), Ciriacremum sp. 1 (27 times), Paurocephala sp. 1 (23 times), Ciriacremum nigeriense (26 times), Heteropsylla cubana (22 times), Colophorina sp. (22 times), Yangus sp. 1 (23 times). Seventeen species were collected less than five times: Ciriacremum sp. 3, Kleiniella sp. 1, Kleiniella sp. 2, Kleiniella sp. 3, Diaphorina sp., Epipsylla sp.1, Epipsylla sp. 2, Euryconus sp.,
Euphaleurinae Gen. sp. 2, Euphaleurinae Gen. sp. 3, Paurocephala sp. 3, Diildophlebia irvingiae, Diildophlebia leptonchiae, Syntomoza sp., Palaeolindbergiella sp. 1, Palaeolindbergiella sp. 2 and Psyllinae/Arytaininae Gen. sp.

Phenology: From January 2006 to December 2007, Heteropsylla cabana was collected 22 times at Nkoemvone. Most of the time all developmental stages were observed on its host plant, Leucena sp. Psyllids pullulation were noted from April and September 2006, from March and August 2007. The monthly variation of larvae, males and females of Heteropsylla cubana collected at Nkoemvone on Leucena sp. showed that psyllid pullulation varied during the period of observations (Fig. 1). Phenology of host plant justifies this proliferation because during the rainy season, this plant renews its leaves.

From January 2006 to December 2007, Ciriacreum nigeriensis was collected 26 times at Nkolandom. Most of the time all developmental stages were observed on its host plant, Hylodendron gabunensis. Four peaks of proliferation were observed: March, June and September 2006 and April 2007. The monthly variation of larvae, males and females of Ciriacreum nigeriensis collected at Nkolandom on Hylodendron gabunensis showed that psyllid pullulation varied from one month to another during the period of observations (Fig. 2). Phenology of host plant justifies this proliferation because during the rainy season it renews its leaves.

From January 2006 to December 2007, Yangus sp. 1 was collected 23 times at Nkoemvone. Most of the time all developmental stages were observed on host plant, Albizia adiantifolia. Three peaks of proliferation were observed: a major peak at June 2006, a constant peak from March to June 2007 and the last peak at October 2007. The monthly variation of larvae, males and females of Yangus sp. 1 collected at Nkoemvone on Albizia adiantifolia showed that psyllids pullulation varied from one month to another during the period of observations (Fig. 3). This difference of proliferation was due by the phenology of host plant.

From January 2006 to December 2007, Ciriacreum sp. 1 was collected 27 times at Nkoemvone. Most of the time all developmental stages were observed on host plant, Plagiosiphon

![Fig. 1: Numbers of larvae, males and females of Heteropsylla cubana collected at Nkoemvone on Leucena sp.](image)
Fig. 2: Numbers of larvae, males and females of *Ciriacremun nigeriense* collected at Nkolandom on *Hylocladon gabunensis*

Fig. 3: Numbers of larvae, males and females of *Yangus* sp. 1 collected at Nkoemvone on *Albizia adiantifolia*

*longitubus*. Two peaks of proliferation were noted: May to July 2006 and May 2007. The monthly variation of larvae, males and females of *Ciriacremun* sp. 1 collected at Nkoemvone on *Flagiosiphon longitubus* showed that psyllid pullulation varied from one month to another during the period of this study (Fig. 4). Phenology of host plant justifies this proliferation because during the rainy season it renews theirs leaves.

From January 2006 to December 2007, *Colophorina* sp. was collected 22 times at Nkoemvone. Most of the time all developmental stages were observed on host plant, *Baphiopsis parviflora*. Two
Fig. 4: Numbers of larvae, males and females of *Ciriacremun* sp. 1 collected at Nkoemvone on *Plagiosiphon longitubus*

![Graph showing population trends of larvae, males, and females.]

Fig. 5: Numbers of larvae, males and females of *Colophorina* sp. collected at Nkoemvone on *Baphiopsis parviflora*

![Graph showing population trends of larvae, males, and females.]

peaks of proliferation were observed: a minor peak at May 2006, a major peak at April 2007. The monthly variation of larvae, males and females of *Colophorina* sp. collected at Nkoemvone on *Baphiopsis parviflora* showed that psyllid pullulation varied from one month to another during the period of observations (Fig. 5). After the rainfall, this host plant renews its leaves, Phenology of host plant justifies this proliferation.

From January 2006 to December 2007, Euphaleriae Gen. sp. 1 was collected 30 times at Nkolandom. Most of the time all developmental stages were observed on host plant, *Millettia laurentii*. Three peaks of proliferation were noted: a major peak at April 2006, two minor peaks at October 2006 and May 2007. The monthly variation of larvae, males and females of Euphaleriae Gen. sp.1 collected at Nkolandom on *Millettia laurentii* showed that psyllid pullulation varied from one month to another during the period of observations (Fig. 6).
Fig. 6: Numbers of larvae, males and females of Euphaleriniae Gen. sp.1 collected at Nkolandom on Millettia laurentii

Fig. 7: Numbers of larvae, males and females of Paurocephala. sp.1 collected at Nkolandom on Cnestis ferruginea

From January 2006 to December 2007, Paurocephala. sp.1 was collected 26 times at Nkolandom. Most of the time all developmental stages were observed on host plant, Cnestis ferruginea. Three peaks of proliferation were observed: April 2006 and 2007, November 2007; two minor peaks insert to the major peak: November 2006 and June 2007. The monthly variation of larvae, males and females of Paurocephala. sp.1 collected at Nkolandom on Cnestis ferruginea showed that psyllid pullulation varied from one month to another during the period of observations (Fig. 7). Phenology of host plant justifies this proliferation because during and after the rainy season it renews theirs leaves.
<table>
<thead>
<tr>
<th>Host family</th>
<th>Host genus</th>
<th>Associated psyllid species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteraceae</td>
<td>Vernonia</td>
<td>Diaphorina sp.</td>
</tr>
<tr>
<td>Connnaraceae</td>
<td>Aglaea</td>
<td>Paurocephala sp. 2</td>
</tr>
<tr>
<td>Connnaraceae</td>
<td>Cnestis</td>
<td>Paurocephala sp. 1</td>
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<td>Margaria aria</td>
<td>Epipsylla sp. 1</td>
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<tr>
<td>Euphorbiaceae</td>
<td>Bicinodendron</td>
<td>Diclidophlebia swani</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Loezenera</td>
<td>Kleiniella sp. 2</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Albidia</td>
<td>Yangus sp. 1; Y. sp. 2; Y. sp. 3; Y. sp. 4; Y. sp. 5</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Anthoanaha</td>
<td>Psyllinae Gen. sp.</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Baphiopsis</td>
<td>Colophorina sp.; Epipsylla sp. 2</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Dalbergia</td>
<td>Palaeolindbergiella sp. 1; P. sp. 2</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Detarium</td>
<td>Euphaleriinae Gen. sp 2</td>
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<tr>
<td>Fabaceae</td>
<td>Dialium</td>
<td>Euryconus sp.</td>
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<tr>
<td>Fabaceae</td>
<td>Hylosedron</td>
<td>Ciriacremum nigeriniae</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Hymenostegia</td>
<td>Ciriacremum sp. 2; C. sp. 3; Kleiniella sp. 1; K.sp. 4</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Leucaena</td>
<td>Heteropsylla cubana</td>
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<tr>
<td>Fabaceae</td>
<td>Milletia</td>
<td>Euphaleriinae Gen. sp.1; Euphaleriinae Gen. sp.3</td>
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<tr>
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<td>Plagiosiphon</td>
<td>Ciriacremum sp. 1</td>
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<td>Urena</td>
<td>Diclidophlebia sp.</td>
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<tr>
<td>Fabaceae</td>
<td>Zenkerella</td>
<td>Kleiniella sp. 3</td>
</tr>
<tr>
<td>Placouriaceae</td>
<td>Homalium</td>
<td>Syntomoza sp.</td>
</tr>
<tr>
<td>Simaroubaceae</td>
<td>Irvingia</td>
<td>Diclidophlebia irvingiae</td>
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<tr>
<td>Sterculiaceae</td>
<td>Leptonychia</td>
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<tr>
<td>Sterculiaceae</td>
<td>Triplochiton</td>
<td>Diclidophlebia eastopi; D. Harrisoni</td>
</tr>
</tbody>
</table>

**Host plants:** Host plants families and genera with associated psyllid species are listed; only one psyllid specie reported from the South Region of Cameroon have unknown host plant (Table 2).

The Fabaceae constitutes the family with the largest number of associated psyllid species, it includes 14 species of host plants; their psyllids belong to the genera: *Ciriacremum, Colophorina, Diclidophlebia, Euphaleriinae Gen. sp.; Euryconus, Heteropsylla, Kleiniella, Palaeolindbergiella sp., Psyllinae/Arytainninae Gen. sp. and Yangus*. In this family, *Hymenostegia felicis* hosted two different species: *Ciriacremum* sp. 2 and *Kleiniella* sp. 4; and *Dalbergia* sp. hosted also two different species of *Palaeolindbergiella* genus. *Albizia* and *Hymenostegia* genera host plant were respectively associated five and four psyllid species. The family of Connnaraceae includes two species; their psyllids belong to the *Paurocephala* genus. The family of Euphorbiaceae includes two species; their psyllids belong to the *Diaphorina* genus. The family of Sterculiaceae includes two species; their psyllids belong to the *Diclidophlebia* genus. The other families are represented by only one species: Asteraceae, its psyllid belongs to the *Diaphorina* genus; Placouriaceae and Simaroubaceae, its psyllids belong respectively to *Syntomoza* and *Diclidophlebia* genera. *Triplochiton scleroxylon* hosted two species: *Diclidophlebia eastopi* and *D. harrisoni*.

Some damages caused by psyllids of Psyllidae family on their host plants were recorded and photographed. During higher proliferation, larvae of Euphaleriinae Gen. sp.1 invaded leaves of *Milletia laurentii* (Fig. 8a); larvae of Psyllinae/Arytainninae Gen. sp. on *Annonota macrophylla* secreted a white waxy flocculence on the flowers and buds of their host plants (Fig. 8b); *Ciriacremum* sp. 3 on *Hymenostegia azelii*, induced distortion and deformation on leaves (Fig. 8c). Larvae and adults of *Yangus* sp. 4, induced galls on leaves of *Albizia zigia* (Fig. 8d) and *Colophorina* sp. on *Baphiopsis parviiflora* induced discoloration on leaves (Fig. 8e).
Fig. 8: Psyllids damages on host plants, (a) Larvae of Euphalearurinae Gen. sp1 fixed on leaves of *Milletia laurentii*, (b) white waxy flocculence produced by Psyllinae/Arytaininae Gen. sp on *Anthonota macrophylla*, (c) distortion and deformation induced by larvae of *Ciriacreum* sp. 3 on leaves of *Hymenostegia afzelii*, (d) distortion and galls induced by *Yangus* sp. 4 on leaves of *Albizia zigia*, (e) white waxy flocculence and discoloring produced by *Colophorina* sp. on buds of *Baphiopsis parviflora*

In various regions of Cameroon, Tamesse (2005) collected 26 species of psyllids of Psyllidae family, within 14 genera and 8 subfamilies. In the Western region of Cameroon, Dzokou et al. (2009) recognised 37 species, 22 genera and 7 subfamilies. In the Center region of Cameroon, Yana et al. (2010) recognised 45 species, 24 genera and 7 subfamilies. During the present survey, we recorded within the same family in the South region of Cameroon, 35 species belonging to 16 genera and 6 subfamilies. Four genera and 18 species are undescribed. Among the 35 species, 30 are reported for the first time from the South region. The Psyllidae family is more diversify in Cameroon than Triozidae and Phacopteronidae families; according to Tamesse et al. (2007) who included 2 genera and 35 psyllids species in Triozidae family and Malenovsky et al. (2007) who indicated 9 psyllids species in Phacopteronidae family in Cameroon.
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REFERENCES


