Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2023; 11(3): 08-13
© 2023 JEZS
Received: 11-02-2023
Accepted: 19-03-2023

Mveyo Ndankeu Yves Patrick
(1) Laboratory of Zoology, Faculty of Sciences, University of Yaounde I, P.O. Box 812 Yaounde, Cameroon
(2) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon

Dayang Louis Djakbé
(1) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon
(2) Departement of microbiology hematology and immunology, Faculty of Medicine and Pharmaceutical Sciences, University of Dschang, P.O. Box 96 Dschang, Cameroon

Mapon Nsangou Indoz
(1) Laboratory of Zoology, Faculty of Sciences, University of Yaounde I, P.O. Box 812 Yaounde, Cameroon
(2) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon

Magne Ngando Stéphanie
(1) Laboratory of Zoology, Faculty of Sciences, University of Yaounde I, P.O. Box 812 Yaounde, Cameroon
(2) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon

Dzokou Victor Joly
(1) Laboratory of Zoology, Faculty of Sciences, University of Yaounde I, P.O. Box 812 Yaounde, Cameroon
(2) Department of Crop Sciences, Faculty of Agronomy and Agricultural Sciences, Crop Protection, UR_PHYZA (Laboratory of Agricultural Zoology), University of Dschang, Dschang, P.O. Box 96 Dschang, Cameroon

Yana Wenceslas
(1) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon
(2) Laboratory of Biological Sciences, Faculty of Sciences, University of Bamenda, P.O. Box 39 Bambili, Cameroon

Tamesse Joseph Lebel
Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon

Corresponding Author:
Mveyo Ndankeu Yves Patrick
(1) Laboratory of Zoology, Faculty of Sciences, University of Yaounde I, P.O. Box 812 Yaounde, Cameroon
(2) Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I, P.O. Box 47 Yaounde, Cameroon

Diaphorina strychnos sp. nov. (Hemiptera: Liviidae), a new species of psyllid associated with *Strychnos innocua* Delile, 1826 (Loganiaceae) in Cameroon

Mveyo Ndankeu Yves Patrick, Dayang Louis Djakbé, Mapon Nsangou Indoz, Magne Ngando Stéphanie, Dzokou Victor Joly, Yana Wenceslas and Tamesse Joseph Lebel

DOI: https://doi.org/10.22271/j.ento.2023.v11.i3a.9192

Abstract
Strychnos innocua (Loganiaceae) is a valuable timber tree, used locally as traditional medicine to treat several diseases such as gonorrhea, snake bites, conjunctivitis and diarrhea; fruits and leaves of this plant are also fed by human and cattle. This plant is attacked by a psyllid which causes serious damage by inducing leaf galls, defoliation and necrosis. The aim of this work is the description and identification of the psyllid associated with *Strychnos innocua* in Cameroon, and thus contributes to the psyllid biodiversity study in Cameroonian fauna. The study was carried out in Adamawa Region of Cameroon, on wooded savannah of Wack cliff, from July 2015 to July 2016. The psyllid of *Strychnos innocua*, *Diaphorina strychnos* sp. nov., can be diagnosed by: the stage V larva, antenna composed of eight segments and the antennal segments: 3, 4, 6 and 7, each bears a single subapical rhinarium; abdomen bears a circular circumanal with a single row of waxy rounded pores and presents a deep internal depression on its anterior margin; posterior abdominal margin bears lanceolate setae. In adult, trapezoidal vertex; rhinaria of flagellomeres 2 and 4 of antenna are surrounded by simples setae; forewing is covered by irregular patches on the entire surface; costal and sub-costal veins (C+Sc) of the hingwing bear four setae before the costal break and six plus five setae and hamelus after the costal break (4+6+5+1); metathoracic leg has a short and rounded meracanthus; the apical part of metatibia bears seven spurs (3 internals and 4 externals) and the metabasitarsus bears two spurs (one internal and one external); cylindrical paramere with a slightly narrowed apical portion which is incurved subapically on internal margin; female proctiger is triangular with a large proximal part and narrow apical part, rounded apex; female sub-genital plate is formed of two lobes: a proximal large lobe and a distal pointed lobe. Comparing *Diaphorina strychnos* with the specimens recorded previously elsewhere, it is morphologically different from them and can be reported as new specie in the *Diaphorina* Löw, 1880 genus.

Keywords: Taxonomy, psyllid, pest, *Strychnos innocua*, Cameroon

Introduction
Psyllids or "jumping plant-lice" (Hemiptera: Psylloidea) form a group of sap-sucking insects of their host plants. They develop generally on Dicotyledons plants with some exceptions on Monocotyledons and Conifers (Burckhardt *et al*., 2004) [1]. Like all other Hemiptera, psyllids can become important pests, which can seriously inhibit the growth and development of many cultivated plants as well as non-cultivated plants (Hodkinson., 1974; Burckhardt., 1994) [2, 3]. In Cameroon, few studies have already been undertaken on the taxonomy of psyllids; despite this, the data on the description remain insufficient because many are still to this day undescribed, including the psyllid of *Strychnos innocua* Délile, 1826 which belong to the *Diaphorina* Löw 1880, genus.
Diaphorina is a large genus with some 80 species described from tropical and subtropical regions of the Old World and peninsula Arabia (Capener, 1970; Burckhardt & Mifsud, 1998; Burckhardt & Ouvrard, 2012; Malenovsky & Burckhardt, 2014) [4, 5, 6, 7]. The species of psyllids belonging to the genus *Diaphorina* have been more studied and reported usually in the Old World regions. No species belonging in *Diaphorina* genus is described in Cameroon,

however several species on this genus are reported by some authors on plants in this country (Dzokou, 2010; Yana, 2012; Mveyo Ndankeu, 2017; Dayang, 2020) [8, 9, 10, 11]. Only one specie has been redescribed by Aléné *et al*. (2011) [12], it is *Diaphorina enderleini* associated with *Vernonia amygdalina*. The Asian citrus psyllid, *Diaphorina citri* Kuwayama, is widely distributed in southern Asia. It is an important pest of citrus in several countries as it is a vector of a serious citrus disease called Huanglongbing or greening disease; this disease is responsible for the destruction of several citrus industries in Asia (Manjunath *et al*., 2008) [13] and Africa (Tamesse & Messi, 2000, 2002, 2004) [14, 15, 16].

Strychnos innocua is non cultivated plant belonging to the family plant of Loganiaceae. The local name of this plant in North region of Cameroon is "Muratuta or Djatibolohi" and is widely distributed in the savannahs, tropical Africa (Malzy, 1954) [17]. This plant species is used locally as traditional medicine, the root is used to treat tuberculosis (Ouaba *et al*., 2006) [18], the crust is used to treat gonorrhea, snake bites, conjunctivitis and diarrhea; it facilitates child delivery of pregnant women; fruits and leaves are fed by human and cattle (Nacoulma-Ouédraogo, 1996; Boullard, 2001) [19, 20]. Given the importance of this plant in agricultural and traditional African medecine, it is very necessary for us to describe and identify this psyllid associated to *Strychnos innocua* and thus contributes to the psyllid biodiversity study in Cameroonian fauna.

Materials and methods

The larvae and adults of *Strychnos innocua* psyllids were collected on wooded savannah of Wack Cliff (Fig.1) located in Adamawa region of Cameroon (latitude 7°33'05.3"N, longitude 13°33'23.2"E and 1375 m altitude). The specimens were collected in the field during the running season from July 2015 to July 2016.

Adult psyllids were collected with a mouth aspirator and an entomological sweep net of 0.5 mm mesh size. Advanced stage larvae were sampled directly from buds and leaves of the host plant.

Conservation and laboratory handling: The specimens were preserved and deposited dry and slide-mounted or in 70% ethanol and were deposited in the Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I (LZUY).

The morphological studies were carried out with a binocular magnifier LEICA L2 mark (fitted with an ocular micrometer graduated from 0 to 10 micrometric units) and a light microscope LEICA DM 1000 mark. The psyllids of the 5th larval stage and adults were maintained in a solution of sodium hydroxide (NaOH) at 100 g/l for about 3 to 4 hours. This solution dissolved the internal organs and softened the chitinous cuticle. The different organs to describe in adults were detached with the help of two fine needles mounted on wooden handles. The mounting was done under the stereomicroscope mark LEICA L2. The dissected organs were mounted on an objective slide in polyvinyl drop and covered with an objective slide cover. The drawings (diagrams) were realized under a microscope equipped with a drawing tube. The host plant was identified at National Herbarium of Yaounde (NHY). The following abbreviations are used: LZUY = Laboratory of Zoology, Higher Teacher's Training College, University of Yaounde I; NHY = National Herbarium of Yaounde.

Terminologies: The terminology adopted here to describe this new species, *Diaphorina strychnos* sp. nov. has been used by authors such as Capener (1970, 1973) [4, 21], Hodkinson & White (1979) [22], Hollis (1987) [23], Ossiannilsson (1992) [24]. The measurement of adults and fifth instar larvae were done with the use of a stereomicroscope having an ocular micrometer graduated from 0 to 10 micrometric units. Measurements done on the 5th instar larvae, constituted body length; body width; antenna length; forewing-pad length; metatibia length. While for adults measurements constituted body length; body width; head width; antenna length; first flagellomere length; genal process length; forewing length; forewing width; hindwing length; hindwing width; metatibia length; metafemur length; male proctiger length; paramere length; distal segment of aedeagus length; female proctiger length; female subgenital plate length.

Data analysis: Data measurements were obtained in micrometric units and were converted to mm, while taking into account existing magnifications. The PAST software v.3.20 allowed to generate the minimums, maximums, means and standard errors; values were finally expressed as means ± standard errors (Mean ± SE).

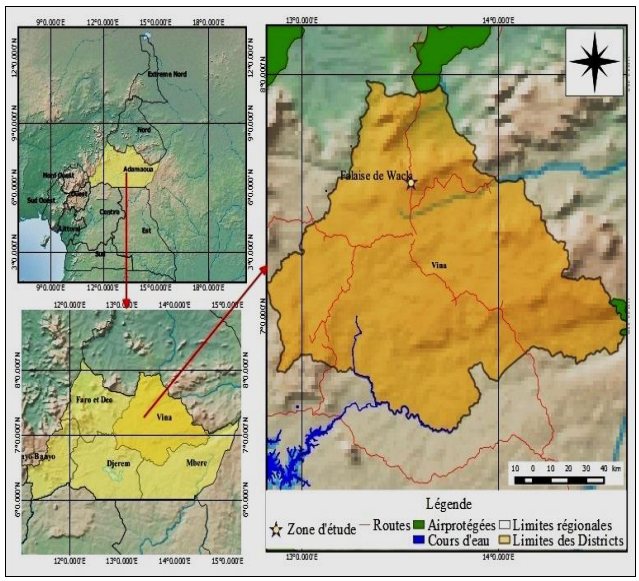

Fig 1: Sampling sites

Results

Description of *Diaphorina strychnos* sp. nov.

Deposit of standard series: specimens of *Diaphorina strychnos* sp. nov. collected, were deposited in the Laboratory of Zoology, Higher Teacher's Training College, University of Yaoundé I (LZUY).

Material examined: Paratype. Cameroon: wooded savannah of Wack Cliff: 16 vii 2015, 5♂, 12♀, 7 larvae.

Etymology: the name of the species refers to its host plant genus *Strychnos*.

Stage V larva (Fig. 2)

Coloration: The fifth instar larva is overall yellow with red compound eyes. There are three pairs of dark spots on the dorsal side of the thorax. On the dorsal side of the abdomen, there are four dark sclerites its anterior part and its ventral side bears four pairs of clear sternites.

Structure: the average measures of stage V larva (Table. 1) is 1.84 ± 0.08 mm long and 0.69 ± 0.04 mm wide; it is 2.66 times longer than wide. Body is elongated, flattened dorso-ventrally. Margins of head and wing pads lacking any visible setae, caudal plate margin with lanceolate setae (Fig. 2A). Antenna (Fig. 2D) with 3 segments, apical segment posteriorly with five pointed lanceolate setae and four rhinaria; antenna average measures is 0.34 ± 0.01 mm long; and is ended by a short subapical seta and long apical seta. Metatarsus carries a triangular arolium (Fig. 2B). Abdomen is bloated with lanceolate setae, the ventral side bears patches which determine its future segmentation; the abdomen bears a circular circumanal with a single row of elongate pores, and the anterior margin of the circumanal has a deep depression (Fig. 2C). The measurements of fifth instar larva in Table 1.

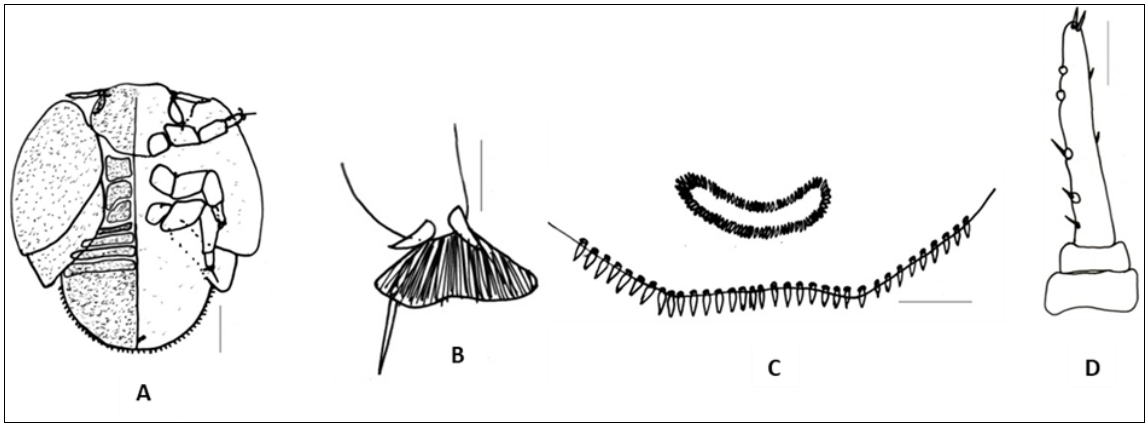

Fig 2: Fifth instar larva of *Diaphorina strychnos* sp. nov. A, ventral view and dorsal view; B, Arolium; C, circumanal structure; D, antenna. Scale bars: 0.08mm (A); 0.02mm (B and C).: 0,08 mm (A); 0,02 mm (B); 0,02mm (C); 0,02 mm (D).

Table 1: Measurements (in mm) of fifth instar larva of *Diaphorina strychnos* n. sp (N = number of specimens measured).

Parameters	N	Minimum	Maximum	Average	Standard Error
BL	15	1.4	2.8	1.84	0.08
BW	15	0.56	1.2	0.69	0.04
AL	15	0.24	0.52	0.34	0.01
WL	15	0.6	1.6	1	0.05
MTL	15	0.16	0.28	0.22	0.1
BL/BW	15	2.46	2.43	2.66	0.77

Legend: BL: body length; BW: body width; AL: antenna length; WL: forewing length; MTL: metatibial length

Adults

Coloration: the overall body of adults is yellow; the compound eyes are dark and the ocelli translucent; the antenna is yellow-dark at the basal portion and the flagellum yellow-clear; forewing is densely covered with dark and clear patches on the surface.

Structure: the average measures of adults (Table. 2) is 4.42 ± 0.08 mm long and 1.13 ± 0.03 mm wide to the male, and is 4.14 ± 0.06 mm long and 1.18 ± 0.12 mm wide to the female; it is 3.9 times and 3.5 longer than wide respectively in male and in female.

Vertex is trapezoidal and bears short setae and is divided by a medial furrow; the vertex is wider than long; frontal cones are well developed longer than wide with rounded apex; they bear long simple lanceolate setae. Antenna (Fig. 3F) not filiform and composed of 10 segments; flagellomeres 2, 4, 6 and 7 carries a single large rhinarium; rhinaria of flagellomeres 2 and 4 are surrounded by small simple setae; the first flagellomere is the longest antennal segment. Antennal segment are approximately 0.8 times long as a width of the head in male and female. Antenna is 6.8 to 7.7 times longer than the length of the first flagellomere in male and female respectively.

Forewing (Fig. 3I) is oval, constricted at the proximal part, enlarged and rounded at the apex; it 2.4 times longer than wide in male and female, pterostigma is presnt and narrow. The conspicuous veins bear shortand simple setae. The hingwing (Fig. 3J) bearing four setae before the costal break and six plus five setae and hamelus after the costal break (4+6+5+1); it is 2.8 times longer than wide in male and female. The hind leg (Fig. 3G) is composed of a coxa with a short meracanthus with a rounded apex; the metatibia (Fig.3G and 3H) is sparse by simple setae and bears apically 7 spurs (3 external and 4 internal); the metabasitarsus is sparse by simple setae and bears apically 2 spurs; the metatarsus is ended by a claw and globular arolium; the average measures of metatibia and metafemur is respectively 0.83 ± 0.02 mm long and 0.56 ± 0.02 mm long in male and female. The male genitalia (Fig. 3L) is composed of a paramere, an aedeagus, a proctiger and a subgenital plate; the average measures of paramere is 0.39 ± 0.02 mm long, is generally tubular with an apical end narrowed and curved in its apical third, its medial part is enlarged and there is a small depression in its proximal part on the external margin; it is sparse by long simple setae (Fig. 3M). The aedeagus is composed by a long proximal part and a short distal part; the average measures of distal portion is 0.33 ± 0.01 mm long, it has a curved apex and inner margin is slightly sinusoidal (Fig. 3N). The proctiger (Fig. 3O) is shaped like a saddle with a large proximal portion and narrowed apical portion with a truncate apex; the distal portion is sparse by lanceolate setae, the average measures is 0.56 ± 0.01 mm long. The female genitalia (Fig. 3K) is composed of a triangular proctiger (0.66 ± 0.02 mm long) with a large proximal part and narrow apical part rounded apex; the circumanal is semi-circular with two rows of rounded pores; it bears long simples and short lanceolate setae; the female sub-genital plate is formed of two lobes: a proximal large lobe and a distal pointed lobe. Adult measurements of *Diaphorina strychnos* n. sp. in Table 2.

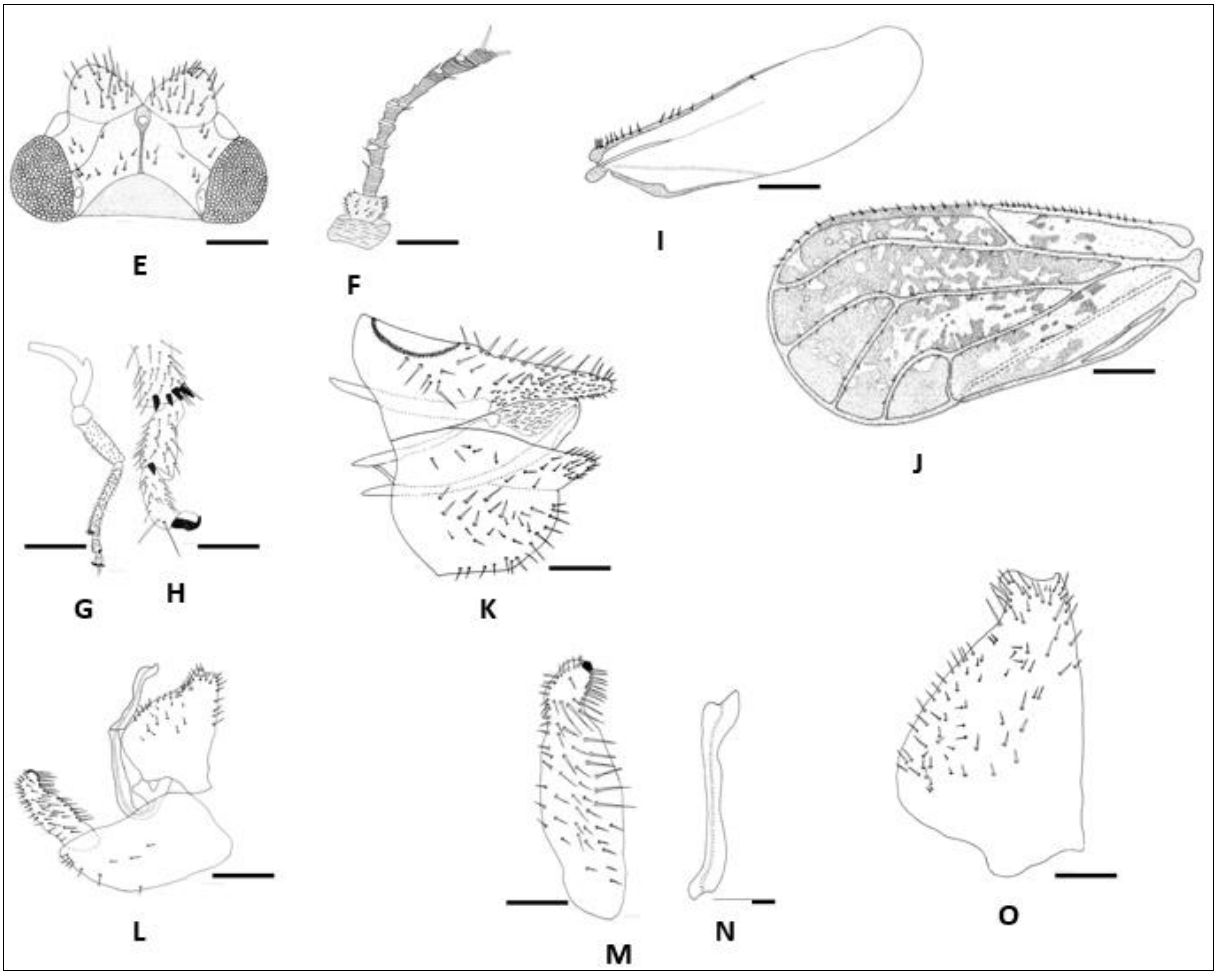

Fig 3: Adult of *Diaphorina strychnos* sp. nov. E, head; F, antenna; G and H, metathoracic leg; I, forewing; J, hindwing; K, female genitalia; L, male genitalia; M, paramere; N, distal portion of aedeagus; O, male proctiger. Scale bars: 0.04 mm (E); 0.02 mm (F); 0,08 mm (G); 0,08 mm (H); 0,08 mm (I); 0,08 mm (J); 0.04 mm (K); 0.04 mm (L); 0,08 mm (M); 0,02 mm (N); 0,02 mm (O)

Table 2: Measurements (in mm) of adults of *Diaphorina strychnos* n. sp

	Males					Females				
Parameters	**N**	**Min.**	**Max**	**Avg**	**E.S.**	**N**	**Min.**	**Max**	**Avg**	**E.S.**
BL	22	3.2	4.84	4.418	0.078	36	3.24	4.8	4.144	0.06
BW	22	0.8	1.32	1.132	0.026	36	1	1.32	1.176	0.116
HW	22	0.52	0.92	0.803	0.019	36	0.6	1	0.826	0.016
AL	22	0.32	0.72	0.612	0.02	36	0.48	0.76	0.653	0.012
F1	22	0.04	0.16	0.09	0.008	36	0.04	0.16	0.084	0.044
WL	22	2.6	3.4	3.112	0.039	36	2.8	3.56	3.25	0.03
WW	22	1	1.52	1.305	0.029	36	1.04	1.52	1.35	0.019
wL	22	1.84	2.4	2.204	0.039	36	1.76	3	2.268	0.048
wW	22	0.56	0.88	0.774	0.017	36	0.6	1.04	0.82	0.015
MTL	22	0.6	1	0.834	0.022	36	0.48	1.08	0.84	0.018
MFL	22	0.4	0.68	0.56	0.016	36	0.4	0.76	0.584	0.014
PL	22	0.28	0.56	0.388	0.018	-	-	-	-	-
ProL	22	0.44	0.72	0.561	0.014	36	0.44	0.8	0.656	0.016
DL	22	0.28	0.4	0.333	0.009	-	-	-	-	-
FSPL	-	-	-	-	-	36	0.32	0.6	0.448	0.01
BL/BW	22	4	3.66	3.902	3	36	3.24	3.636	3.523	0.517
WL/WW	22	2,6	2,236	2,384	1,344	36	2,6923	2,342	2,407	1,578
WL/ wL	22	1,413	1,416	1,411	1	36	1,590	1,186	1,432	0,625
AL/F1	22	8	4.5	6.8	2.5	36	12	4.75	7.773	0.272
ProL/HW	22	0.846	0.782	0.698	0.736	36	0.733	0.8	0.794	1
MTL/HW	22	1.153	1.086	1.038	1.157	36	0.8	1.08	1.016	1.125
AL/HW	22	0.615	0.782	0.762	1.052	36	0.8	0.76	0.790	0.75
ProL/FSPL	-	-	-	-	-	36	1.375	1.333	1.464	1.6

Legend: BL: body length; BW: body width; HW: head width; AL: antenna length; F1: length of first antennal flagellomere; FCL: frontal cone length; WL: forewing length; WW: forewing width; wL: hindwing length; wW: hindwing width; MTL: metatibial length; MFL: metafemur length; DL: Distal aedeagus length; PL: paramere length; ProL: proctiger length; FSPL: female subgenital plate length; SE = standard error; Max = maximum; Min = minimum; Avg = average; N = number of measured specimens.

Bio-ecology and Damage

The months of March and April in Adamawa, mark the return of the rains with a proliferation of leaf outbreaks and an increase in temperature, all these conditions are very favorable to a large proliferation of individuals of *Diaphorina strychnos* at these times of the year. Numerical variation of *Diaphorina strychnos* individuals in the year depends of the phenology of the host plant. Larvae and adults of *Diaphorina strychnos* suck sap from the host plant, *Strychnos innocua*, from the underside of the leaves, resulting in distortion and curling of leaves, resulting in blistered leaves (Fig. 4). This will induce partial and then total defoliation of some leaves. Larvae and adults usually attack the young leaves of the plant, causing the buds to curl. The curling of buds and leaves, distortion and defoliation of the leaves are due to the effect of toxins.

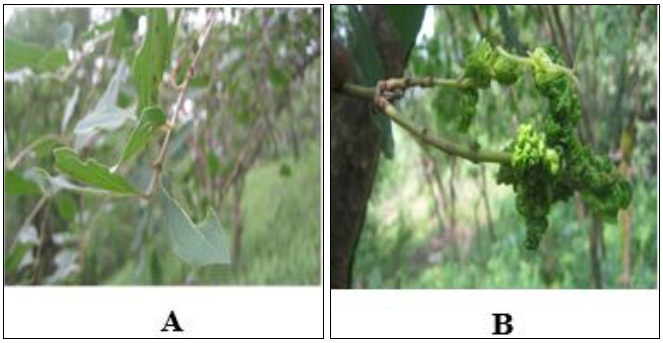

Fig 4: Damage induce by *Diaphorina strychnos* sp. n on *Strychnos innocua*. A, healthy stem; B, stem attacked

Discussion

Diaphorina strychnos n. sp described in this work differs from *Diaphorina fabulosa* (Capener) redescribed by Hollis (1987) [23], *Diaphorina clutiae* and *Diaphorina loranthi* described by Capener (1970, 1973) [4][21] all has reported in South Africa, and also differs from *Diaphorina caliginosa* described by Malenovsky & Burckhart (2014) [7] reported in Yemen, by the structure of genal processes, vertex shape, forewing pattern, distribution of setae in margin costal break of hindwing, morphology of different part of the genitalia male and female and morphometric characters.

Diaphorina fabulosa has reported on the same host plant *Strychnos innocua*. Head of *Diaphorina fabulosa*, with genal cones more than twice as wide as long, very divergent and with rounded apex, whereas in *Diaphorina strychnos* frontal cones are well developed longer than wide with rounded apex slightly divergent; antennal 0.56-0.62 and 0.62-0.78 times as long as head width respectively in *Diaphorina fabulosa* and in *Diaphorina strychnos*; distal portion of aedeagus has a incurved sinusoidal apex, whereas in *Diaphorina fabulosa* it is rounded; paramere is generally tubular in this two species, but with an apical end more narrowed and more incurved in its apical third in *Diaphorina strychnos* than in *Diaphorina fabulosa*. The fifth instar larva is 2.66 times and 1.4 times longer than wide respectively *Diaphorina strychnos* and *Diaphorina fabulosa;* humeral lobes of *Diaphorina fabulosa* much less well developed than *Diaphorina strychnos.*

Head of *Diaphorina strychnos* is 1.4 times larger than that of *Diaphorina loranthi*. Frontal cones of *Diaphorina loranthi* measure 0.14 to 0.15 mm long in males, 0.15 to 0.18 mm long in females, those of *Diaphorina clutiae* measure 0.12 to 0.14 mm long and 0.14 mm wide for both sexes, while those of *Diaphorina strychnos* measure on average 0.20 mm long and 0.16 mm wide in females 0.19 mm long and 0.13 mm wide in males. Vertex of *Diaphorina clutiae* is convex while in of *Diaphorina strychnos* is trapezoidal. Antenna of *Diaphorina strychnos* is 1.3 to 1.4 times longer than that of *Diaphorina loranthi* it is 1.5 to 1.6 times longer than that of *Diaphorina clutiae*. Forewing of *Diaphorina strychnos* is 1.3 to 1.4 times longer than that of *Diaphorina clutiae*and 1.3 to 1.5 times longer than *Diaphorina loranthi*. Hingwing of *Diaphorina citri* has 1 setae before the costal break and six setae after the break (1 + 6+1) while in of *Diaphorina strychnos* there are 4 setae before the costal break and 12 setae after costal break (4 + 11 + 1). Metatibia of *Diaphorina clutiae* and *Diaphorina loranthi* carries 8 crown spurs apically while in *Diaphorina strychnos* carries 7 spurs apically. Paramere of *Diaphorina clutiae* and *Diaphorina loranthi* is flattened and tubular while in *Diaphorina strychnos* the paramere is tubular with narrowed and curved apical third; its median part is enlarged. Distal portion of the aedeagus of *Diaphorina strychnos* is slightly sinusoidal on internal margin, an outer margin slightly curved and curved apex while in *Diaphorina clutiae* has a globular apex. Female proctiger of *Diaphorina strychnos* bears simple setae and short lanceolate setae on its surface, *Diaphorina loranthi* and *Diaphorina clutiae* the female proctiger carries only simple setae on its surface. Female subgenital plate of *Diaphorina strychnos* is pointed in its distal part and there is a sub-terminal depression on this plate while in *Diaphorina clutiae* and *Diaphorina loranthi* there is no depression.

Diaphorina caliginosa on host plant *Carissa spinarum* L. (Apocynaceae). Head of *Diaphorina caliginosa*, with genal cones approximately as long as vertex along midline, with straight inner margins contiguous basally and strongly divergent in two thirds, whereas in *Diaphorina strychnos* frontal cones are simply developed with rounded apex slightly divergent. Antenna relatively long about 0.9 and 0.8 times as long as head width respectively in *Diaphorina caliginosa* and in *Diaphorina strychnos*. Metatibia of *Diaphorina strychnos* is bears apically 7 spurs (3 external and 4 internal) and the metabasitarsus bears apically 2 dark sclerotised apical spurs like *Diaphorina caliginosa.* Forewing of *Diaphorina caliginosa* has and Rs vein more sinuate in apical half than *Diaphorina strychnos*. Hingwing costal margin with 4+11+1 and 2+8+1 ungrouped setae respectively in *Diaphorina strychnos* and *Diaphorina caliginosa*. Distal segment of *Diaphorina caliginosa* with a characteristically apex dilated and perpendicular in the apical third while is simply straight and rounded in *Diaphorina strychnos.* Female subgenital of *Diaphorina strychnos* plate with a characteristic sub-terminal depression on this plate who is not visible in *Diaphorina caliginosa*.

Conclusion

Diaphorina strychnos sp. nov. described in this work is morphologically different from the other species described previously elsewhere. The morphological difference is based mostly on the forewing and higwing pattern, genal processes, male and female genitalia and the circumanal of the fifth instar larva. Diaphorina is a genus peculiar to temperate, Asian and Afrotropical regions; this is the first time a new species has been described in Cameroon after the redescription of *Diaphorina enderleini* associated with *Vernonia amygdalina* by Alene *et al*. (2011) [12]. Considering the economic importance of the host pant *Strychnos innocua* (Loganiaceae), plant species is used locally as traditional

medicine to treat gonorrhea, snake bites, conjunctivitis and diarrhea; it facilitates child delivery of pregnant women; fruits and leaves are fed by human and cattle, it is necessary to put in place a strategy which will permits to protect the host plant against the pest insect identified in this survey. This consists to find natural enemies (predators or parasitoids) of *S. innocua* which can be used to control its population.

Recommendations

After the description and identification of *Diaphorina strychnos* as new pest insect species associated to *Strychnos innocua*, the protection of the host plant is needed. Biological control should be the adequate strategy to control this pest though natural enemies such as predators and parasitoids.

References

1. Burckhardt D, Espirito-Santo MM, Fernandes GW, Malenovsky I. Gall-inducing jumping plant-lice of the Neotropical genus *Baccharopelma* (Hemiptera, Psylloidea) associated with *Baccharis* (Asteraceae). Journal of Natural History. 2004;38:2051-2071.
2. Hodkinson ID. The biology of the Psylloidea (Homoptera): a review. Bulletin of Entomological Research. 1974;64:325-339.
3. Burckhardt D. Psylloid pests of temperate and subtropical crops and ornamental plants (Hemiptera, Psylloidea): a review. Trends in Agricultural Sciences, Entomology. 1994;2:173-186.
4. Capener AL. Southern African Psyllidae (Homoptera)-2: some new species of *Diaphorina* Löw. Journal of Entomological Society of Southern Africa. 1970;33(2):200-226.
5. Burckhardt D, Mifsud D. Psylloidea (Hemiptera) of the Arabian Peninsula. Fauna Arabia. 1998;17:7-49.
6. Burckhardt D, Ouvrard D. A revised classification of the jumping plant-lice (Hemiptera: Psylloidea). Zootaxa. 2012;3509:1-34.
7. Malenovský I, Burckhardt D. Jumping plant-lice of Socotra Island (Hemiptera: Psylloidea). Acta entomologica musei nationalis pragae. 2014;54(Supplementum):23-61.
8. Dzokou VJ. Inventaire et dynamique des Psylles (Hemiptera-Psylloidea) de la Ménoua (Ouest-Cameroun) et taxonomie des Homotomidae Heslop-Harrison du Cameroun. Thèse de Doctorat Ph.D, Faculté des Sciences, Université de Yaoundé I, Cameroun ; c2010. p. 202.
9. Yana W. Bioécologie, Faunistique des psylles (Hemiptera-Psylloidea) de la Région du Centre et taxonomie des Ciriacreminae Enderlein 1910 du Cameroun. Thèse de Doctorat Ph.D., Faculté des Sciences, Unversité de Yaoundé I, Cameroun; c2012. p. 220.
10. Mveyo Ndankeu YP. Faunistique, bioécologie des psylles (Hemiptera-Psylloidea) de la Région du Sud et taxonomie du genre *Yangus* Fang (Aphalaroidinae) du Cameroun. Thèse de Doctorat Ph.D., Faculté des Sciences, Université de Yaoundé 1, Cameroun; c2017. p. 240.
11. Dayang LD. Taxinomie et écologie des psylles (Hemiptera-Psylloidea) inféodés aux plantes hôtes du plateau de l'Adamaoua Cameroun: Thèse de Doctorat Ph.D, Faculté des Sciences, Université de Yaoundé I, Cameroun; c2020. p. 290.
12. Aléné DC, Djiéto-Lordon C, Burckhardt D. Unusual behaviour – unusual morphology: mutualistic relationships between ants (Hymenoptera: Formicidae) and *Diaphorina enderleini* (Hemiptera: Psylloidea), associated with *Vernonia amygdalina* (Asteraceae). African Invertebrates. 2011;52(2):353-361.
13. Manjunath KL, Halbert SE, Ramadugu C, Webb S, Lee RF. Detection of '*Candidatus Liberibacter asiaticus*' in *Diaphorina citri* and its importance in the management of citrus huanglongbing in Florida. Phytopathology. 2008;98:387-396.
14. Tamesse JL, Messi J. Réceptivité a *Trioza erytreae* (Del Guercio) de variétés d'agrumes au Cameroun. Fruits. 2000;55:389-400.
15. Tamesse JL, Messi J. Incidence de *Trioza erytreae* (Del Guercio) (Homoptera: Triozidae), psylle vecteur du greening, sur la croissance des plantules d'agrumes dans une pépinière au Cameroun. Insect Science and Application. 2002;22(2):97-103.
16. Tamesse JL, Messi J. Facteurs influençant la dynamique des populations du psylle africain des agrumes *Trioza erytreae* Del Guercio (Hemiptera: Triozidae) au Cameroun. International Journal of Tropical Insect Science. 2004;24(3):213-227.
17. Malzy P. Quelques plantes du Nord Cameroun et leurs utilisations. Journal d'agriculture tropicale et de botanique appliquée. 1954;1(5):148-179.
18. Ouaba P, Lykke AM, Boussim J, Guinko S. La flore médicinale de la Forêt Classée de Niangoloko (Burkina Faso). Etudes flor. vég. Burkina Faso. 2006;10:5-16.
19. Nacoulma-Ouédraogo. Plantes médicinales et pratiques médicales au Burkina Faso: cas du plateau central. Faculté des Sciences et Techniques, Université de Ouagadougou. 1996;320:42-53.
20. Boullard B. Plantes médicinales du monde. Croyances et réalités. Edition ESTEM. Paris; c2001.
21. Capener AL. Southern African Psyllidae (Homoptera)-3: a new genus and new species of South African Psyllidae. Journal of Entomological Society of Southern Africa. 1073;36(1):37-61.
22. Hodkinson ID, White IM. New psyllids from France with redescriptions of the type species of *Floria* Löw and *Amblyrhina* Löw (Homoptera-Psyllidae). Entomologica Scandinavia. 1979;10:55-63.
23. Hollis D. A new citrus-feeding psyllid from the Comoro Islands, with a review of the *Diaphorina amoena* species group (Homoptera). Systematic Entomology. 1987;12:47-61.
24. Ossiannilsson F. Psylloidea (Homoptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica. 1992;26:1-347.