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2019
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Cameroon
TOPIC
"Applied Scientific
Research - Supported Start-
up academy initiative"
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	Tuesday, June 11, 2019		Wednesday, June 12, 2019		Thursday, June 13, 2019	
07:30 – 08:30	Conference Check -in		Coffee		Coffee	
Room	I		I	II	I	II
Chair			**Dr.Kotue C.**	**Dr. Pacio R.**	**Dr. Tche J.**	**Dr. Djouaka J.**
08:30 – 09:00	Welcome speech		Tsomene Pierre	Kuate Norbert	Alex N.	Kenneth Chi
09:00 – 09:30	Lunching of the PKFokam Platform		Mafouo Vanessa	Djomaha E.	Sipping M.	Mvogo Audrey
09:30 – 10:00	The PKFokam awards 2020		Mvongo V.	Moguem A.	Nzali S.	Tekandjo L.
10:00 – 10:30	Coffee		Coffee		Coffee	
Room	I	II	I	II	I	II
Chair	**Dr. Temegne C.**	**Dr. Valery K.**	**Pr. Kamgaing T.**	**Dr.Mapme G.**	**Pr. Njine T**	**Pr. Ngonkeu E.**
10:30 – 11:00	Fotseu Arnold	Dr. Likeng-Li-Ngue	Mawouma J.	Agbor T. junior	Dr.Mapme G.	Lantche F.
11:00 – 11:30	Dzepe Daniel	Dr.Ntsomboh G.	Motsa´a J.	Kouoplong P.	Dr. Awouafack M	Ngoukwa G.
11:30 – 12:00	Chakam Muriel	Dr.Kotue C.	Dr. Lienou JP	Tekou Lucien	Dr. Djouaka J.	Deutcheu S.
12:00 – 12:30	Dr. Fokom R	Ngou Djou H.	Dr.Temegne C.	Tagning Pegis	Dr. Tche J.	Atabong P.
12:30 – 14:00	Lunch		Lunch		Lunch	
Room	I	II	I	II	II	I
Chair	**Dr. Fokom R.**	**Dr.Ntsomboh G.**	**Dr. Awouafack**	**Dr. Kamdem N.**	**Dr. Likeng-Li-N**	**Dr. Lienou JP**
14:00 – 14:30	Tedah Douglas	Dr. Moffo	Dongmo Francis	Mpemboura S.	Nyetam	Wankio S.
14:30 – 15:00	Talla Rostand	Nkuika Arnaud	Pr. Kamgaing T.	Motchewo N.	Honoré T	Kagou M.
15:00 – 15:30	Yonti C.	Dr. Fonkwa G.		Kouomou Peguy	Room I Pr. Ngonkeu E.	
15:30 – 16:00	Poster session -1		Poster session -2			
16:00 – 16:30	Coffee		Coffee		Coffee	
Room	I		I			
Co-chair : 16:30 – 18:00 18:00 – 19:00	Dr. Kamdem N & Dr. Simo Topic: Youth Innovation **Panelists:** **Cedric Simen** (Young Engineer Vehicle creativity Bafoussam) **Awa Bless Chi** (Child Engineer, creativity)		Pkfokam journal for science & technology: Inaugural edition Panelists: Dr. Meutchieye F; Dr. Temegne C; Dr. Awouafack M; Dr. Tche Jacob; Dr Pacio R.; Dr. Lienou; Dr. Kamdem N.		Conférence débat autour du livre du Dr. SIMO Djom Maurice Titre : La guerre économique Modérateur : Prof. Eddy Ngonkeu **Regards croisés de :** Prof. Claude Fingoué Prof. Gérard Messina	

SIMO KAMDEM Marguerite

Antioxidant, anti-inflammatory and chemical analysis of fractions from Cameroonian medicinal plants extracts

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Inflammation is a part of the complex biological response of vascular tissues to harmful stimuli, such as ROS, damaged cells, irritants or pathogens. There are mainly two types of inflammation which are acute and chronic inflammation. The occurrence of Chronic inflammatory diseases, generally associated with oxidative stress, constitute an important public health problem today. This outbreak is due not only to the increase of risk factors, but also to the toxicity of therapeutic molecules available. In the aim to explore the potential spring of new therapeutic molecules, efficient and with a wide spectrum of action, we have evaluated antioxidant and anti-inflammatory activity of extract and fractions from Cameroonian plants.

Five Cameroonian medicinal plants were selected from 2 plants families (Annonaceae, and Lamiaceae) and investigated for bioactivities properties. From these plants, 12 crude extracts, 28 fractions, and 3 purified compounds were obtained by maceration and fractionation using organic solvents and their biological activities were evaluated. The antioxidant activity was evaluated following the scavenging potential of extract and fractions against the DPPH free radical, and their oxygen radical absorbance capacity. The anti-inflammatory activity was assessed following the denaturation of proteins and cell membrane disruption assays.

Stem extract of *Uvaria comperei* exerted the strongest radical scavenging potential, with a 50% scavenging concentration (SC50) of 12.96 µg/ml, followed by leave extract of *vitex rivularis* and seeds extract of *vitex rivularis* which showed SC50¬ of 25.31 and 43.12 µg/ml respectively. All the extracts presented the ORAC activity with IC50 ranging from 6753 to 10767µmoltrol/g. The most active selected extracts showed anti-inflammatory activities as well as the selected fractions.

The observed results indicate that these extracts have a significant antioxidant and anti-inflammatory activities. The results could be correlated positively with total phenolic content and extracts could be used as natural anti-inflammatory product.

Keywords: Antioxidant, anti-inflammatory, Extracts

MVOGO NYEBE Rolly Audrey

Quality foods and feeding for sustainable health: bio-production of aflatoxin-free maize (Zea mays) and peanut (Arachis hypogaea) in Cameroon with fungi-based microbial preparations

MVOGO NYEBE ROLLY AUDREY, PhD student in Biochemistry, Laboratory for Food Science and Metabolism, University of Yaounde I
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Maize and Peanuts are the most produced and consumed grains in Cameroon and sub-Saharan Africa. Their production and conservation mostly requires chemicals (as pesticides, fungicides, fertilizers and/or preservatives), with much harm on the environment, on the health of direct and indirect consumers (humans and animals). My research project's objective is therefore the production of a quantitative, health-risk free and eco-friendly Maize and Peanuts in the different agro-ecological conditions of Cameroon and by extension of Africa (Given Cameroon is considered as Africa in miniature). Aflatoxins being considered as the most important risk for these foodstuffs (affecting more than 65% of the production), I would develop and promote an aflatoxin-free bio-production system of these grains by investigating on the screening of naturally present microorganisms: AMF (Arbuscular Mycorrhizal Fungi) and PGPR (Plant Growth Promoting Rhizobacteria) with the effects listed above. The expected results are to find fungal and microbial broad-spectrum strains and combinations capable of showing efficacy in almost all the agro-ecological zones of Cameroon and sub-Saharan Africa, the biological production and protection of these foodstuffs, the reduction of the economical losses, of the environmental threats and health burdens associated to their production, conservation and consumption. These results could be measured by the compliance level with international trade standards, the reduction of post-harvest losses, the reduction of side effects on human and animal health, and the preservative effects on the environment.

FOTSEU KOUAM Arnold

Quality of water used for the irrigation of wetland crops in the humid zone of Yaounde (Cameroon)

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Wetlands are now a pole of production of market gardening crops and various products to meet the perishable food needs in large cities. Irrigation of these crops is mainly provided by local water resources including wastewater of all kinds, which are ultimately emptied in wetlands. Although this water has the advantage in that it is rich in phosphate and nitrate for plants, it remains a potential source of parasite contamination. In Cameroon, helminthiases are among the most chronic parasitic diseases. When they are evacuated in feces, their eggs and larvae spend part of their cycle in the external environment be

fore re-infecting humans through contaminated food or water. It was in the light to study the parasitological quality of the water used for crop irrigation that a study was conducted from January to June 2016 in a few marshy areas in Yaounde. Monthly water sampling was carried out on eight wetlands namely (Bonamoussadi, Melen, Etoug-ebe, Mvog-betsi, Mokolo-elobie, Tsinga, Ekounou and Damas). Observations of helminth eggs and larvae were made under an inverted microscope after concentration of the samples. The physicochemical analyzes revealed poorly oxygenated waters, moderately mineralized (566.16µS/cm), poor in Suspension Materials (31.21mg/L), in nitrates (5.48mg/L), in ammoniacal nitrogen (0.32mg/L) and orthophosphates (5.77±2.40mg/L). The biological analysis revealed the presence of eggs and larvae (514parasitic agents/L) belonging to the species Ascaris sp., *Enterobius* sp., *Ankylostomes* sp., *Strongyloides* sp., *Trychostrongylus* sp., *Trichuris* sp., *Taenia* sp., *Hymenolepis nana*, *Hymenolepis diminuta*, *Diphyllobothrium* sp., *Fasciola* sp. In the short rainy season 361±274 parasitic agents/L were counted against 153±119parasitic agents/L in the long dry season. The results obtained showed that the swampy areas studied were subjected to faecal pollution which greatly degrades the quality of the water. To limit the risks of contamination of crops and humans, it is necessary to create mechanisms that can reduce the parasitological load of water before their release into nature.

Key words: Crops, Resistance, Helminths, Swamp, Pollution

SIPPING Marius Trésor

Characterization and antioxidant activities of stem barks from a Cameroonian medicinal plant

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Oxidative stress is a phenomenon involved in many diseases acting severely in Africa as cancers, neurodegenerative, cardiovascular and metabolic diseases. Despite the increase of conventional methods to overcome these diseases, they remain a problem of public health. So, medicinal plants are more than more exploited in treatment of human diseases according to their less cost, toxicity and biological activities. These are generally attributed to their metabolites. The present study aims to partially characterize and evaluate *in vitro* antioxidant potential of some extracts from a Cameroonian medicinal plant. Four extracts named AE, HE, ME and TP are obtained respectively from water, hydroethanolic, methanolic and ethanolic solutions by maceration and decoctions. The different extracts were freeze-dried and stored in a dry place for further experiments. The partial characterization was done by total proteins, phenol compounds and sugars determination. The *in vitro* antioxidant properties were carried out by free radical scavenging assays (ABTS, DPPH) and ferrous ion chelation. As results, AE, HE, ME and TP were yielded by 7.78; 3.38; 12.48; 7.55%. They are constituted of sugars, phenolic compounds and proteins in different levels. In fact, TP is the richest in total sugars (205.83±10.74 µgeqG/mg DW) and phenolic compounds (129.46±1.98 EAF/mg DW). The highest level of protein was found in Hydroethanolic extract (27.55±0.39 eqBSA/mg DW). Analysis of biological activity has revealed that these extracts had a dose-dependent anti-radical DPPH activity (100-500 µg/mL) with EC50 of 255,1; 188,5; 208,6 and 404,6 µg/mL for AE, HE, ME and TP respectively. Moreover, all extracts have exhibited excellent scavenging

ABTS activities with EC50 of 350,9; 245,3; 189,0 and 163,7 µg/mL. The extracts have also shown an ability to chelate metal ions with EC50 of 319,0; 281,5; 316,1; 311,4 µg/mL.

With these biological activities, the aqueous, hydroethanolic, methanolic and total polysaccharide extracts of the stem barks of medicinal plants can be exploited as potent antioxidative agents in the treatment of diseases. Furthermore, more investigations are necessary to confirm this assessment.

Keywords: Oxidative stress, characterization, medicinal plants, extracts.

TSOMENE NAMEKONG Pierre

Dissemination of pathogenic protozoa in drinking water in Yaoundé

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A study was carried out from June to November 2017 on ten springs in Kondengui (Yaounde). This work was aimed at identifying and counting the different environmental forms of cysts and oocysts of pathogenic protozoa on the one hand. Sampling of water specimens was done each month at the different sampling points. Physicochemical analyses were done both in situ and in the laboratory of Hydrobiology and Environment, of the University of Yaounde I. The different resistance forms of cysts and oocysts were observed using an optical microscope of mark IVYMEN at an objective of 40x after concentration of the samples using the method of sedimentation and the technique of Faust. The physicochemical analyses reveal that water from the ten springs examined is slightly acidic (6.18 ± 0.08 U.C) fairly mineralized (324,26 ± 18,18 µS/cm) with an average temperature of 24,15 ± 0,12°C.As for the biological evaluation, the results reveal the presence of some resistant forms of intestinal protozoa such as: the cysts of amoebae (*Entamoeba histolytica*), those of flagellated protozoa such as (*Giardia duodénalis* and *Chilomastix mesnilii*), ciliates (*Balantidium coli*), oocysts and sporocysts of sporozoaires (*Isospora belli, Cryptosporidium* sp., *Cyclospora cayetanensis* and *Sarcocystis* sp.). A total of 6657 cysts, oocysts and sporocysts were identified with sizes varying from 4 to 63 µm. The cysts and oocysts and of small sizes were the most abundant with a high abundance of the oocysts of *Cryptosporidium* sp. (2672 oocysts). The greatest cysts density recorded during the small dry season. ¶The presence of all these micro-organisms indicate pollution of faecal origin. The deterioration of the springs water quality is highly influenced by their proximity to pollution sources and the very poor prevailing hygienic conditions existing in this urban district.
Key words: Sources, Cysts, Oocyst, pathogenic protozoa

PACIO Rochelle

Preserving Cameroon's Cultures and Traditions (CAMCT) Using App and Cloud Computing

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In today's world, people are addicted to their mobile devices due to its interactive features. Multimedia plays an important role on why people keep using their mobile technologies to gather information through the combination of text with video, animation, audio, graphic and virtual reality. This study aimed to develop an app and use cloud computing for storage. This app will greatly help in disseminating consistent information from one generation to another. Also, it will boost cultural tourism and innovate museums as tourists and locals will enjoy the use of this app while knowing everything about Cameroon. The methodology used for this study was Rapid Application Development (RAD) designed to provide quick software methodology that involves iterative development and quick construction of prototypes.

NGUENANG NJIOJOB Alex Joel

Effect of slaughterhouse wastewater on the floristic diversity of macrophytes in a tropical urban area

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Poster Nr: 7

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The preservation of biodiversity, the sustainable management of ecosystems and the population growth associated with urbanization are today vital and urgent issues. In order to evaluate and identify the effects of the pollution of the Etoudi slaughterhouse on the floristic diversity of the Ako'o watercourse, four gradient were sampled namely: upstream of the Ako'o watercourse, at the exit of raw effluent from the slaughterhouse, the contact of the raw effluent with the watercourse and downstream of the course in order to better estimate the progress of the pollutant. Thus, three floristic inventory surveys were conducted for a comparative study of diversity in polluted and unpolluted environment. Similarly, the physicochemical parameters of the water were analyzed in the four gradients during these survey.

The results show that the average pH was neutral overall (7.2 ± 0.2). The average temperature 26.45 ± 1.6 ˚C was lower than the MINEPDED standard norms for discharge. The highest values of conductivity (1258.7 ± 709.7 µS / cm), phosphates (265.5 ± 281.8 mg/L), COD (1419 ± 547 mg/L) and BOD_5 (384 ± 77.6 mg/L) were at the outlet of the slaughterhouse's raw effluent. The nitrate level (1626.3 ± 734 mg/L) was also higher at this level. Significant differences were recorded between the parameters of the raw effluent leaving the slaughterhouse and the three other levy levels. Shannon-Weaver diversity indices were variable. The highest value was at upstream of the stream (H '= 3.43) and the lowest being at the outlet of the raw effluent course (H' = 2.82). The Sorensen index for all four levels was below 50, thus demonstrating a non-similarity in their species richness. The physicochemical parameters are negatively and significantly correlated with the diversity indices overall, thus making a very highly significant correlation ($p<0.001$) between the frequency of the genera and the MES (-0.83) and $NO3^-$ (-0.87), and a lack of correlation between Shannon's index and these settings. The table summarizing the abundance of species at each gradient makes it possible to highlight phytoremediating plant for this effluent such as *Echinochloa pyramidalis* and *Panicum maximum* with respectively average recovery rates of 77% and 66%.

Keywords: Floristic diversity, macrophytes, pollution, slaughterhouse, Yaoundé.

NKUIKA FANYA Arnaud

Automation of human nutrition (software)

CEO start-up Software - Tech - Industries - Animal (Cameroon).

Poster Nr: 8

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After 08 years of research, I found the fastest way mathematically that allows to accurately finding the rations of each person according to his age, sex, etc. and then I automated it (innovation). This step directly opens the way to robotization. My automatic method is called the "**Fanya Nkuika Arnaud method**". I combined the square of **Karl PEARSON**, English mathematician (1857-1936) and other methods for obtaining this calculator. This book will enable researchers, nutritionists, students to understand the mechanics of human nutrition automation through mathematical formulas. The book ISBN: 9786138459651 explain the operation of the algorithm mathematically with some demonstrations.

OMARY Housseny

Study of the effect of ficus sp on obesity: Valorization of species and research an anti-hyperlipidemic phyto-drug.

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Ethno-pharmacological investigations in the Mahajanga City revealed that the bark of *Ficus* sp is used to treat diabetes and obesity. A large number of Malagasy people use it for the facial mask. In this study, we focused on the effect of this plant on obesity because it causes other pathologies such as hypertension and diabetes, which affect large numbers of the world population. Our objectives is to valorize this plant for this therapeutic virtue and take into account to keep its sustainability in its natural ecosystem. To carry out this study, we checked the effect of this plant (at doses 500 and 1000 mg/kg) on the feeding behavior of the mice: to reduce the amount of food ingested and to increase gastric emptying. Decreased body fat mass with F sp extract to reduce weight. From the results, the control mice ingest 2.96 g±0.15 of food. In contrast, the crude extract of F sp significantly decreases the cumulative amount of food ingested as a function of dose. The mice treated with the dose 500 mg/kg ingested only 2.09 g±0.26 (p=0.0068< 0.05) and 1.6 g±0.34 (p=0.0023< 0.05) for the dose 1000 mg/kg. For gastric emptying, only mice treated with 1000 mg / kg of F sp significantly affected gastric emptying compared to control mice receiving only distilled water (94.75%±2.21 vs 63.21%±0.94 at P=0.0029< 0.05). Regarding the fat mass, mice treated with F sp at doses 500 and 100 mg/kg, their total weight of adipose tissue are significantly lower than that of the control (1.14g±0.089 and 0.77g±0.049 vs 1.68g±0.11). Finally, as we have a promising result, this study would make it possible to better understand the use of F sp for its treatment and would therefore be part of the prospects for recovery and conservation of a species.

AGBOR TAKU Junior

A Full Range Android Application for Geological Field Data Collection and Management

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Geological mapping campaigns generate hundreds of different entries that are recorded usually in field note books and transferred subsequently in varied software to create maps, plots and for geological interpretations. Though effective, data collection on paper is labour intensive, difficult in wet conditions, has low data integrity and greatly limits future utilization of data and the ability to expand the mapping program. Electronic data collection systems are thought to be a viable solution to address these constraints and improve mapping efficiency. We have developed an application (Field geologist) for electronic data acquisition and management in the field, which runs on consumer-grade Android cell phones and tablets. By focusing on a simple, stand-alone application with customized and intuitive interface, we attempt to decrease both the technological and cost barriers that hinder adoption of electronic data collection in geological mapping. The simplicity of Field geologist makes it easy to use without prior training. This low-cost, accessible and effective solution paves the way for the adoption of digital field mapping as the new norm.

Keyword: Geological Field Mapping, Android Application, Field Geologist, Cell phone, Tablet

KOTUE TAPTUE Charles

Natural product (Amino acids) from black bean seed (Phaseolus vulgaris L.) used to manage Sickle Cell Disease in West Region of Cameroon

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Sickle cell disease (SCD) is a genetic blood disorder with over dominance affecting red blood cells (RBCs) with high morbidity and mortality rates. SCD occurs due to the substitution of a hydrophilic glutamic acid residue by a hydrophobic valine residue at the sixth position of the β-chain of haemoglobin molecule. Present studies were carried out on black bean seeds to evaluate the Invitro antiradical antioxidant activities and antisickling properties. Blood was collected fromconfirmed sickle cell patients to evaluate the antisickling properties of the amino acids extract and to evaluate the membrane stability effect of the extract. This sickle cell blood sample was incubated with 2% metabisulfite and amino acid extract at different concentrations for 2 hours followed by calculation of sickling percentage. Osmotic fragility was also carried out at different concentrations of the extract and saline solution. The initial sickling percentage was on average 28.4%. Sickling percentage after incubation with the extract at different concentrations (6; 8; 10 and 12mg/ml) and metabisulfite ranged from 28.4 to 4.5% on average. From the four amino acid concentrations tested on sickle cell blood, C4 (12mg/ml) had the best antisickling activity with an average inhibition percentage of 92.06%. for the blood samples not induced with metabisulfite sickling percentage also decreased from 28.4 to 4.25 and still demonstrated a high reversibility percentage ranging from 47.9 to 86.74. % Haemolysis also decreased at different extract concentration. The antiradical test showed a significant concentration dependent inhibitory activity on free radicals of 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and hydroxyl radical (HO) with the amino acid extract with IC50 between 7.62 and 12.33, 12 and 2.03 respectively. The amino acid extract showed an antioxidant potential and a high reducing power, but they remain below the standard. The amino acids extract from black bean seeds demonstrated an inhibitory activity on sickling and a stability effect on the membranes of erythrocytes. they also showed a free radical scavenging activity and an antioxidant potential with a high reduction effects.
Keywords: sickle cell disease, black bean seeds, sickling, antisickling, antioxidant, antiradical

GOUMTSA Ariane Falone

Evaluation of the preventive effects of the aqueous and methanolic extracts of the seeds of Aframomun pruinosum (Zingiberacaea) on Isoproterenol -induced cardiac hypertrophy in rat

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Background: Cardiovascular Disease (CVD), remains the principal cause of death in both developed and developing countries. On a global level, CVD accounts for 31% of all deaths. Hypertension holds a unique place in population health and health care because it is the leading cause of CVD such as myocardial infarction, cardiac failure and cardiac hypertrophy. Cardiac hypertrophy is an adaptive response to an increased workload mediated by an increase in muscle mass to maintain cardiac output; it generally progresses to cardiac remodeling. The rat model of isoprenalin has been extensively used to evaluate several cardiac dysfunctions. Plants synthesize numerous second metabolites and could serve as potential source of new drugs. *Aframomum pruinosum* is a medicinal plant that is widely used in Cameroon in the treatment of cardiac's complications. Aim: The main objective of this study is to evaluate the ability of *A. pruinosum* seed extracts to prevent cardiac's complications of hypertension such as cardiac hypertrophy. Methods: This study is intended to identify the ability of *A. pruinosum* extracts to stimulate NO production by endothelial cells; determine the in vitro vasorelaxants effects of *A. pruinosum* extracts on rat aorta; evaluate the protective effects of extracts of *A. pruinosum* on Isoprenalin- induced cardiac hypertrophy. Results: At the end of this work, we expect that the extracts of A. Pruinosum could increased the production of NO by endothelial cell of aorta ,

possessed vasorelaxant activity by reducing the level of intracellular ca2+, reduced the activity of cardiac output and prevent the occurrence of cardiac hypertrophy. Conclusion: Extracts of the seeds of *A. pruinosum* could prevent cardiac hypertrophy in rat

Keys words: Cardiac hypertrophy, Isoprenalin, *A pruinosum*

MOFFO Frédéric

Antibiotic Resistance from a One Health perspective in Cameroon: a systematic review and meta-analysis

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Poster Nr: 13

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BACKGROUND: Antimicrobial resistance (AMR) is widely acknowledged as a global problem, yet in many parts of the world its magnitude is not well elucidated. A baseline assessment of the AMR prevalence is a priority for implementation of laboratory-based AMR surveillance

OBJECTIVES: This review, focused on a One Health approach, aim to describe the current status of AMR in Cameroon.

METHODS: Systematic review was carried out to assess primary study concerning infectious germs which circulated in the human-animal and environment interface and their resistance to antibiotics.

RESULT: 66 full-text articles reviewed were eligible, overall, 19 species of bacteria were tested against 48 antibiotics and were resistant to all classes of antibiotics and showed high levels of multidrug resistance. It emerged that *Escherichia coli, Klebsiella pneumonia, Staphylococcus* spp and *Salmonella* spp, the major bacteria isolated from humans, animals and in the environment were resistant to all classes of antibiotics and showed high levels of multidrug resistance rate comprise between 45.2% [95% CI (38.0 - 54.7)] and 67.1% [95% CI (55.2 – 77.2%)]. These findings are the vital component of any antimicrobial stewardship program and represented the baseline for antimicrobial resistance surveillance system.

CONCLUSION: This review highlights that resistance to commonly prescribed antibiotics in Cameroon is high. The findings emphasize the urgent need to address gaps in the standardization of AMR diagnostics. Effective AMR surveillance through continued data sharing, large-scale collaboration and harmonisation, and coordination of all stakeholders is essential to understand and manage the AMR national burden.

KEYWORDS: Antimicrobial resistance, One Health, Bacteria, Systematic review, Cameroon

MOFFO Frédéric

Risk assessment of emergence of antimicrobial resistance arising from antibiotic use in animal production in Cameroon

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Poster Nr: 14

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BACKGROUND: Inappropriate biosecurity measures and the widespread use of antimicrobials in animal health have led to the emergence of antimicrobial resistance (AMR), with a high risk of transmission to humans through food and the environment.

The multidrugresistance of Helicobacter Pylori against antibiotics has therefore become a major obstacle to treatment. In our work we determined the prevalence of resistance of the clinical isolates of H. pylori in circulation in Douala-Cameroon, and detected the subsequent mechanism of resistance, in particular the expression of efflux pumps for multidrugresistant clinical isolates. Thus, the susceptibility of 100 clinical isolates of the strain of interest, isolated from the gastric biopsies of the patients suffering from gastroduodenal pathologies received in Laquintinie Hospital against 14 antibiotics used in the treatment of these affections was evaluated. Subsequently, multidrugresistant isolates were selected to characterize the expression of efflux pumps, by using Phenylalanine-Arginine -β-Naphthylamide (PAβN), an efflux pump inhibitor. The antibacterial susceptibility test carried out on that isolates showed the following results: 99% of resistance against betalactams family (ampicillin and amoxicillin), 97% for imidazoles family (metronidazole), 13% for quinolones family (nalixidic acid, ciprofloxacin, levofloxacin and norfloxacin), 11.7% for macrolides family (clarithromycin, azithromycin and erythromycin), 0% for rifamycins family (rifabutin) and 4% for tetracyclines family (doxicycline, tetracycline and minocycline). As for the detection of efflux pumps in the 32 multidrugresistant isolates selected, the results showed a potentiating of anti-Helicobacter activity of 128, 64, 32 and 8 fold respectively for metronidazole, clarithromycin, erythromycin and doxicycline. These results suggest that the prevalence of resistance of H. pylori isolates to betalactams and imidazoles is the most highest and that efflux pump (RND) mechanism is involved in the multidrugresistance of that clinical isolates.

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Mercury adsorption mechanism in water by a filter made from sawdust

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Mercury is a metallic substance which is always fluid at ordinary temperature and is commonly called quicksilver; its physical and chemical properties have favored its use, but also make mercury, a contaminant whose toxicity is universally recognized. Despite the awareness of its dangerousness, its presence in the environment remains problematic. The work presented aims to eliminate mercury in water by a filter made from sawdust; for this purpose, we solved the advection-dispersion equation of the linear and non-linear models to determine the variation of mercury concentration inside the filter; the resolution of the advection-dispersion equation for the linear model, was done analytically by the method of the Laplace transform and numerically by the method of RK4; for the nonlinearmodel,wealsoperformedanumericalresolutionusingthe RK4 method. After analyzing the results obtained using the Matlab code, it was found both for the linear and nonlinear model, a progressive decrease in the concentration of the pollutant throughout the filter; which proves the effectiveness of sawdust, for the adsorption of mercury in water. Similarly, for the nonlinear model, an increase in the concentration of the pollutant at the outlet of the filter was observed, as a function of time. Indeed, the concentration ratio of the order of 0.1 is reached at t= 20 days, for the lengths of the filter x1 = 20 cm and x2> 30 cm respectively, in the case linear and non-linear models. Thus, we will say through these results that it is important to take into account the adsorption model in the implementation of the filter system. Keywords: Mercury, sawdust-based filter, adsorption model, linear and nonlinear advection-dispersion equation and water

KOUOPLONG KOUDJOU Pyrrus

Smartphones to fight plant diseases: case of Clinic Plant

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The world needs a stable supply of food, especially since its global population will reach 9 billion in 2050. In these conditions, a real food security becomes more and more crucial. Diseases of crops, however, continue to rage, leading to mass starvation. The challenge is to grow enough food without losing any insects or diseases.

The famous potato famine in Ireland (1845-1847) caused the death of over a million people when the oomycete Phytophthorainfestans caused a downy mildew that infested all crops in the country.

OBJECTIVES: Estimate the risk of emergence and spread of AMR due to the use of veterinary products in Cameroon.

METHODS: A qualitative risk assessment combining available data on the use of antibiotics with expert prior opinion, was used to characterize the risk levels of AMR emergence, persistence and spread in public health in Cameroon.

RESULTS: Overall 70% of antimicrobials consumed in animal health sector were belong to a class of antimicrobials of critical importance to human health according to the joint FAO / WHO / OIE classification. High prevalence of Salmonella spp and *Escherichia coli* multi drug resistant represented a potential hazard to humans and animals. Exposure assessment identifies a possible pathway for AMR bacteria flow through food supply and the environment. Overall risk levels were assessed as low to not very high (5 to 6 in a scale of 1 to 9 with 1=null, 9=very high) from a total of 200 simulations. All the scenarios tested consider the possibility of occurrence of the danger to humans and animals.

CONCLUSION: The risk levels obtained is worrying. It is urgent that important interventions be implemented to reduce this risk and preserve the public health from the emergence of AMR associated with the use of antimicrobial agents in animals.
KEYS WORD: risk assessment, veterinary product, antimicrobial resistance, public health, Cameroon

MOFFO Frédéric

African country capacities to tackle the global threat of antimicrobial resistance from the One Health perspectives

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BACKGROUND: The fight against Antimicrobial Resistance (AMR) demands strict training, monitoring, surveillance and stewardship measures in the public health, animal and environmental sectors. To this effect, a multi-sectoral One Health approach, was developed in 2015 by the tripartite of the united nations agencies (WHO, OIE and FAO), in view of guiding countries towards developing and implementing national action plans (NAP) on AMR by 2017.

OBJECTIVE: The aim of this analysis was to evaluate country capacity for coordinated multisectoral AMR control program in fulfilling the international Health regulation.

METHODS: The AMR country capacities for 37 African countries was analyzed using the scores of the 4 indicators of the AMR technical area of the Joint External Evaluation (JEE) reports. The AMR country self-assessment survey 2017published on the WHO website was also consulted.

RESULTS: Most of the countries evaluated 21/37(56.7%) showed limited capacities (score 1 on a 1 to 5 scale) in the 4 JEE AMR indicators. Only 15 countries (40.6%) had a multi-sectoral AMR-NAP, 7 of which were functional with well-established AMR surveillance systems for the public health and animal sectors, while up to 18 countries (48.6%) completely lack an animal AMR surveillance system.

CONCLUSION: Africa is still greatly lagging behind in the fight against AMR. The animal and environmental sector is highly neglected, thus the need for countries to finalize and implement their AMR-NAP, for the better orientation of resources. There is a need for an intersectoral communication and collaboration to ensure a one health approach in combatting AMR.

KEYS WORD: IHR, antimicrobial resistance, JEE, one Health, Africa

TEPAP ZEMNOU Cromwel

Resistance profile of Helicobacter pylori clinical isolates circulating in Cameroon and phenotypic characterization of efflux pumps mechanism

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The peptic ulcer results from lesions of the stomach wall characterized by a loss of substance of the gastric or duodenal wall amputating all the muscular planes and limited to the bottom by an inflammatory reaction. Therapies of eradication of this bacterium were setting-up but however we observed failures following the development of resistances against these antibiotics.

Nowadays, the Food and Agriculture Organization of the United Nations still estimates that crop diseases each year reduce their potency of yield by at least 40%. (According to FAO, 2013b) Sub-Saharan Africa concentrates the majority of countries in deficit, with 23.8% undernourished or 214 million people.

Faced with this problem, we had to find a solution adapted to our times aiming to reduce agricultural losses and boost production.

We offer farmers, agronomists, researchers and students a mobile application whose role is to diagnose plants from an image taken by a Smartphone to quickly propose effective and efficient solutions. We use a state-of-the-art artificial intelligence technology in order to have an excellent knowledge of image.

The beta version of the app is already available on PlayStore on behalf of ClinicPlant.

YONTI MADIE Calvia

Unidimensional modeling saline intrusion in coastal zones

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Residents of coastal areas consume water from boreholes at the absence of the drinking water distribution network. This borehole water generally contains pollutants of saline origin due to the proximity of the sea, which is responsable of many diseases among the inhabitants of the coastal zones. In these areas, seawater moves progressively towards freshwater and a transition zone develops between them. The purpose of this brief was to determine the appropriate sites for the implantation of boreholes in coastal aquifers. For this purpose, the linear advection dispersion equation was solved analytically by the Laplace transform method and numerically by the fourth order Runge Kutta method (RK4), to determine the spatio-temporal concentration of the Laplace transform. salinity of groundwater in coastal areas. During the analysis of the results obtained by using Matlab coding, it was found that the pollutant increases with time and decreases when one moves away from the source point of the pollutants and that by tolerating 10% of the initial concentration of pollutants in the continents, the service time of the soil in potability is of the order of 22 years for x = 30 km, 38 years for x = 50 km, this shows that the long-term performance of the soil in compared to the distance from the source piont of the salinity.

Keywords: salinity, advection-dispersion, Laplace transform, method of Runge Kutta of order four.

DJOUAKA BAVOUA Judith Liliane

Phytomedecines in Local health care system

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Herbal medecines are used as drugs either as traditional preparations or concoctions of one or several plants, withknowledge and practice passing from generation to generation. Herbals medecines lacks any scientific evidence, in terms of efficacy and safety. Improved traditional medecines derved from traditional use of medecinal plants with the advantage that their chemical composition, biological activity and toxicity have been confirmed via appropriate labs experients, and the dosage and quality control establised before being sold in the market.
But key steps in the development of improved traditional medecines have to be defined.

Some challenges to develop safe and efficient phytomedecines that can be inserted in the local healthcare system and recognized worldwide. Quality control is based on some principles. Solutions should be find.

Key words: Phytomedecines, Herbal medecines, Improved traditional medecines, challenges.

RAZAFIN-DRABAZO Floreane

Evaluation of antioxidant, anti-inflammatory and anti-histaminic activities of the Lygodium lanceolatum Desv ethanol extract

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LygodiumlanceolatumDesv (Lygodiaceae) is a crawling fern endemic to Madagascar and Comoros. The infusion of its aerial part is widely used in Malagasy traditional medicine to alleviate allergic symptoms and specifically asthma crisis. Asthma is a chronic inflammatory disease and crisis could be provoked by allergic phenomena. Actually, the physiopathologic role of the free radical components is well documented. For these reasons, we have conducted this study which aims to evaluate, in vivo, the anti-inflammatory effect of its ethanol extract and, in vitro, its antioxidant and a free radical removal capacity and its anti-histaminic activity on the bronchoconstriction provoked by this amine factor largely released during allergic phenomena.

Effectively, this extract reduces, in time-dependent manner, the carrageenan-inducededema of thehind pawin mice at the dose of 200 mg/Kg administrated orally (55,17 ± 12,2 % at 60th min and 81,33 ± 9 % at 120th min). In the other hand, the extract non-competitively inhibits the contracting activity of the histamine in isolated guinea pig trachea. At 125 µg/ml, the crude extract can reduce to 40% the maximal effect of the histamine. The butanol fraction obtained from the crud extract can reduce until 45% the histamine maximal effect at 62,5 µg/ml.

Its free radical removal capacity is assessed with two methods, by the free radical scavenging test on Diphenyl Picryl Hydrazine (DPPH) and by ferric reducing antioxidant power (FRAP) test. On DPPH, the inhibitory concentration to 50% (IC50) value is 532.53 ± 7.3 µg/ml.The FRAP test indicates a high iron reducing activity at 82.05 ± 0.8 mmol Fe++ / kg. Its antioxidant activity is probably due to its high content in polyphenol estimated by the Folin-ciocalteux colorimetric method.

All of our preliminary results could contribute of its anti-asthmatic virtue in Malagasy traditional medicinal

Key words: LygodiumlanceolatumDesv, antioxidant, anti-inflammatory, anti-histaminic, polyphenols

LIENOU Jean-Pierre

Access to most secure areas is controlled with use of mechanical lock and key

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Access to most secure areas is controlled with use of mechanical lock and key. The objective of this paper is to design a secure door access system using face recognition, raspberry pi and RFID, with capability of data collection and treatment. In this paper, we present three sub-systems that is a system to read, write and protect data on RFID card using raspberry pi and RC522, (The face recognition module has been successfully tested on students attendance) then a decentralized secure access system using the above components with the single addition of a stepper motor which functions as an actuator, finally a web platform to remotely access user data log. Radiofrequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. In our case, it is used to identify a person. When the holder of the tag places the card near the reader, the information is read and cross-referenced in the database for authenticity. If the information is validated, then the door opens and the data timestamped and saved in a local and online server, else the door remains locked. Using RFID tag is more accurate than other biometric means of its high authentication because of its accuracy of detection.

RASAMIMANANA Andriniaina Emilson

Mineralization in the marbles of the Itremo sub-domain, central Madagascar

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Various mineralizations are found in marbles which are metamorphic limestones that can have a beautiful polish. In Madagascar, the important marbles deposit is localised in the central area, within the Itremo sub-domain. This sub-domain is composed of paleoproterozoic calc-silicates, quartzites, metapelites and dolomitic marbles that have deposed, in Statherian-Calymnian, between 1800 Ma and 1500 Ma (Cox and al., 1998, 2004). To the sub-domain of Itremo, the sedimentary host rocks is affected by granitisations and pegmatisations of Cryogenian (740Ma and of 704Ma) and of Ediacaran (<542Ma) ages, that are partly responsible for the mineralizations. Significant mineral deposits are formed in the marbles at the Itremo sub-domain, this project is aimed to understand the mineralizations processes the marbles within these marbles. That study is based on review of previews works, cartography and fieldworks. In the study area, the marbles are reposed in four zones but the outcrop located between longitude E 46°36'48.08 '' and E 47°08'08 '' and latitudes S19°57'33.13 and S20°45'38.77, is intensely mineralized. In his zone marbles are intercalated by quartzites, various granites and gneisses, metapelites. Potential minerals enrichment in this zone are probably facilitated by pegmatites and skarns formation, which are Lithium, beryllium, niobium, tantalum, uranium and rare metals (REE). Mineralizations in marbles in the study area can be characterized, in one hand, by the mechanism of pegmatite field emplacement and their spatial distribution and on the other hand, by the deformation of host rocks.

Key words: marbles, pegmatite, mineralization, granitisations, host rocks.

MOGUEM SOUBGUI Arlette Flore

Prevalence and risk factors of Entamoeba histolytica infestation in 4 to 14 years old children attending KAM NGWINKE EEC School

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Amoebiasis is a curable infestation caused by a protozoan named Entamoeba histolytica. It is an infection related to faecal peril and spreads through hands, drinks and contaminated foods. It is a cosmopolitan parasitosis which is a real health problem in the whole world and particular in the school environment. So, our study aims to determine the prevalence and associated factors of E. histolytica infestation in 4 to 14 years old attending KAM NGWINKE EEC School. To achieve this objective, we conducted a cross-sectional and analytical study on 170 children (65 boys and 85 girls) attending this school, over a period from 07th January to 02sd February 2019 using a non-probabilistic of convenience sampling method. Samples of their stools were collected and had been examined for parasitological identification of the vegetative and cystic forms of E. Histolytica, using respectively physiological water and lugol for the fresh and the staining status. Then, results were statistically analysed. From this study, it appears that about 12.4% of the studied population have presented a positive research for E. Histolytica and this prevalence was so high among men (7.1%) than women (5.3%). The most infested children were those with age ranges between [8-12[years old, representing 7.1% of the prevalence. According to risks factors, it was found that, ignorance of the disease, uncleaning fruits before their consumption and the type of water consumed by te children were been significatively associated to the occurrence of the Entamoeba histolytica infestation ($P < 0.05$). In the other hand, this infestation does not significatively depend on factors like sex or age ($P > 0.05$). This study confirms that Entamoeba histolytica infection is mainly associated to ignorance and poor hygiene practices with the emphasis in school environment. So, we suggest the improvement of the sanitation and food hygiene training in schools.

Key words: Entamoeba histolytica, Amoebiasis, Prevalence, risk factors.

MUKAM MAGNE Hélé Raïssa

Modelling Adsorption and Transport of Chrome VI onto Iron Oxide-Coated Sand filter

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Natural decay of pollutants is rarely considered in mass transport equation. This paper develops a mathematical model of a filter based on iron oxide coated sand for the removal of chromium in groundwater and surface water. The natural decay of chromium was analyzed using a zero-order decay reaction. The advection dispersion equation for this purpose is solved analytically using the Laplace transform method and numerically by the Fourth order Runge kutta method to determine the spatiotemporal distribution of the pollutant through the filter. The control parameters are the adsorption coefficient, the initial concentration and the chromium degradation coefficient. It has been proven that the chromium degradation coefficient strongly affect the concentration values of pollutants inside the filter. The results of this work should be used to manufacture low-cost filters based on iron oxide coated sand.

Keywords: Filter, Sand, Iron oxide, Chromium, Adsorption, advection-dispersion, Laplace.

MONTHE POUNDEU Franck Stève

Fractioning of plant extracts as alternative to optimized antibacterial activity: case of Enantia chlorantha stem barks

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The infectious diseases caused by bacteria constitute the main cause of morbidity and mortality throughout the world and in particular in developing countries. In this work, the influence of fractioning of stem barks methanol extract of Enantia chlorantha were investigated. The aim being to optimize the activity of this extract. The extract was prepared by maceration of barks powder in methanol. Fractioning was done using increasing solvents polarity: Hexane, Ethyl Acetate, n-butanol.Minimum Inhibitory Concentrations (MIC) and Minimum Bactericidal Concentration (MBC) of the methanol extract and fractions were determined using broth microdilution method. The methanol extract of E. chlorantha stem barks was found to be active on all the bacteria tested (32 ≤ MIC ≤ 128 µg/ml). Its activity being significant (MIC < 100 µg/ml) out of 3 of the 6 clinical isolates used. Salmonella enterica serovar paratyphi A was the most sensitive bacterium (MIC = 32 µg/ml). Compared to the extract and other fraction, the n-butanol fraction was found to be more active (32 ≤ MIC ≤ 64 µg/ml). Significant antibacterial activity were observed on all of the 6 bacterial isolates. Lowest MIC value (32 µg/ml) of this fraction was obtained with E. coli (136), and Salmonella enterica serovar typhi (SAL9). The present results showed that the n-butanol fraction of the methanol stem barks extract of E. chlorantha possess the essential antibacterial components and could best be used to fight against bacterial infections as compared to methanol extract.

Keywords: Enantia chlorantha, methanol extract, fractioning, antibacterial activity.

WANKIO TOJU Angele Sophie

Saliva a specimen tools for malaria diagnosis: Detection of plasmodium Dna using Lamp technology

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Poster Nr: 27

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In recent decades, the monitoring of malaria in endemics regions faced to many challenges integrating the diagnostics methods. Current, malaria diagnostic requires blood and blood withdrawal presents many constraints such as, the risks of contracting blood borne pathogens and the trauma caused by needles. Non-invasive sampling will greatly enhance the diagnosis of malaria in remote areas. Saliva is readily available and easy to collect with minimal invasion but has not received much attention hitherto. These attributes of saliva could be explored for early diagnosis of malaria and monitoring the course of the disease. This study was designed to determine the performance of saliva compared to blood in the detection of Plasmodium falciparum DNA using LAMP technology.

Our Cross-sectional study enrolled 100 participants attending OBALA and KUMBA District hospitals. Laboratory analyses were performed at the Biotechnology centre of NKOLBISSON, University of Yaoundé 1. Both blood and saliva samples were collected from each patient using EDTA tubes and OMNIGENE kits (OM-501) respectively. Malaria RDT (SD Bioline Pf/Pan) was performed on each sample prior to molecular analysis. DNA was extracted using Qiagen kits and the detection of Plasmodium DNA was realized by Real Time LAMP and LAMP targeting the species-specific nucleotide sequence of the small subunit

ribosomal RNA gene (18S rRNA) of P falciparum. The data generated were analyzed using R version 3.2 and Microsoft Excel and a p-value < 0.05 was considered statistically significant at 95 % confidence interval.

Of the 100 participants 51 % were males and 49 % were females, 34 asymptomatic and 66 symptomatic patients. Using the RDT, 61 % were positive for plasmodium malaria and 39 % were negative. However, LAMP confronted 59 % of the total sample positive and 41% negative. With Real Time LAMP blood as standard, LAMP of saliva showed a sensitivity and specificity of 70.23 % and 62.5 % respectively with kappa and p-values of 0.221 and 0.006 respectively. RT-LAMP of saliva showed significant sensitivity and specificity of 73.49 % and 76.47 % respectively with kappa and p-values of 0.352 and 0.001.

Although the assay showed lower sensitivity for the diagnosis of P. falciparum in saliva when compared to Real Time LAMP of blood as standard, statistically significant results were recorded. The technique could be useful for the monitoring of malaria disease in our context with saliva as a non-invasive.

Keywords: Blood, LAMP, Malaria diagnosis, Non-invasive, plasmodium DNA, saliva.

KAMGAING Théophile

From the plant to the drug, a successful incubation model at CRESA, University of Dschang, Cameroon

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Poster Nr: 28

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More than 80% of the African population uses medicinal plants for health problems. However, this alternative and/or complementary therapy is questionable for the following reasons: active ingredients of plants and synergistic effects ignored, dose not scientifically established, efficacy and safety not guaranteed. Recognizing these limitations, in 2013, our institution opened a Master's degree course in the Valorization of Medicinal Plants, with the aim of producing improved traditional medicines (MTA) at level 3: chemical composition, activity, toxicity and galenic pre-formulation established.

Three medicinal plants have been implicated, each having a specificity: liver protector (Phyllanthus amarus), antiulcer (terminalia superba), antirheumatic (Ceiba pentadra). Here we summarize the research results with Phyllanthus amarus. The others will be mentioned during the presentation.

- The confirmed presence of many metabolites would justify the use of this plant in traditional medicine

- The acute toxicity of aqueous extracts of the whole plant in rats was evaluated according to OECD guideline 420: no significant toxicity at the 2000 mg / kg BW.

The administration of the aqueous extract at different doses (100, 200, 400 mg / kg BW) one per day/7days showed a significant protective effect on the paracetamol-induced liver injury. The dose of 400 mg / kg BW remarkably prevents elevation of serum ALT and ASAT levels in a dose-dependent manner.

- An MTA (HEPATOPHYL capsule) was implemented according to the good practice of masterful preparation: 6 capsules x 3 / D (daily setting unit)

Keywords : Drug, composition, activity, toxicity, pre-formulation

AWOUAFACK D. Maurice

Phytochemical and biological studies of some Cameroonian medicinal plants

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Background: This investigation was designed to determine the biological activity of secondary metabolites from Eriosema glomerata, E. robustum, and Crotalaria lachnophora three Cameroonian medicinal plants of the family Fabaceae used locally in the treatment of wound, venereal diseases, helminths, coughs, otitis, and skin diseases. Silica gel open column chromatography, preparative TLC, Sephadex LH-20 and reversed phase HPLC were used for fractionation and purification of compounds while their structures were elucidated by spectroscopic techniques (NMR, MS, CD). Agar and microdilution methods, as well as DPPH method were used to evaluate the antimicrobial and antioxidant activities, while the cytotoxicity was determined by MTT assay.

Results: Extracts from the whole plant of E. glomerata and the twigs of E. robustum as well as the whole plant of C. lachnophora afforded two new dihydrochalcones (erioschalcones A and B), and two new flavonols (robusflavones A and B) two new isoflavones (lachnoisoflavones A and B), together with fourteen known compounds, respectively. Semi-synthesis of erioschalcones A and B gave six new derivatives. Erioschalcones A and B had moderate inhibitory activity against Bacillus megaterium, Escherichia coli, Chlorella fusca and Microbotryum violaceum [zone of inhibition (ZI) 7 - 13 mm], while their derivatives, the compounds isolated and the crude extract from C. lachnophora exhibited moderate inhibitory activity (ZI = 7 – 10.7 mm). The antimicrobial activity of semi-synthetic derivatives and their precursors enable to suggest the structure-activity relationship (SAR) of this class of compounds. Fractions and isolated compounds from E. robustum had LC50 values between 13.20 to 100 µg/ml against Vero cells yielding selectivity indices between 0.01 and 1.58.

Conclusion: This investigation led to the characterization of secondary metabolites with several biological activities with some samples that could be useful in the process of drug discovery.

Keywords: Medicinal plants, secondary metabolites, biological activities, SAR

TEKEU Honoré

Next-Generation Sequencing Technology identify a gene as an important contributor to grain yield in an international collection of wheat

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Grain yield components were evaluated in a collection of international wheat accessions. These accessions were genetically characterized using a genotyping-by-sequencing (GBS) protocol that produced 73,784 single nucleotide polymorphism (SNP) markers. A GWAS was conducted to uncover genomic regions controlling variation for grain yield component. In total, seven SNPs were found to be associated with both traits, identifying four quantitative trait loci (QTLs) located on chromosomes 1D, 2D and 4A. In the vicinity of the peak SNP on chromosome 2D, we found a promising candidate gene (D11), whose ortholog had previously been reported to be involved in the regulation of grain size in rice. These markers will be useful in breeding for enhanced wheat productivity

Keywords: Hexaploid wheat (*Triticum aestivum* L.), grain length, grain width, Genome-wide association studies, Genotyping-by-Sequencing.

MAWOUMA PAGNA Julio Issah

Chemical studies and evaluation of antimalarial and antimicrobial activities of two Cameroonian medicinal plants: Trichilia prieuriana and Trichilia tessmannii (Meliaceae).

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Trichilia genus, belonging to the family Meliaceae, consists of about 70 species, mainly distributed in tropical and subtropical regions over the world, 13 of which occur in Cameroon. Plants of this genus, have been used in traditional medicine for the treatment of various ailments including microbial infections, parasitic diseases such as malaria, trypanosomiasis etc. Previous chemical and pharmacological studies have shown that, plants of this genus a rich source of a wide range of secondary metabolites including terpenoids, coumarins, flavonoids and other constituents which possess broad array of pharmacological and biological properties such as antibacterial, antimalarial, trypanocidal activities. As continuation, of our search for bioactive secondary metabolites and active fractions from Cameroonian medicinal plants having as main objective, the development of phytomedicines, hydroethanolic extracts of different parts (leaves, root bark, stem bark and wood) from *Trichilia prieuriana* and *Trichilia tessmannii* were investigated. Herein, we report the evaluation of biological activity of different crude extracts as well as the isolation and structural elucidation of their secondary metabolites.

Methods: After collection, the different parts of plant materials were dried powdered and extracted by maceration at room temperature with the mixture of ethanol/water (7:3). The different crude extracts obtained were evaluated both for their antibacterial activities against different strains of microorganisms using microdilution method and for their antiplasmodial effect on *Plasmodium falciparum*. The active extracts were first submitted to LC-MC analysis to determine their chromatographic profile and then to bio guided fractionation. The different fractions obtained were also bio assayed and their LC-MC recorded followed by their purification through column chromatography, leading to the isolation of pure compounds. The structural elucidation of these compounds was done using spectroscopic techniques (IR, UV, MS, NMR 1D and 2D) and by comparison of their data with those in literature.

Results and conclusion: The results from bio assay shown that, hydroethanolic crude extract of wood of *Trichilia prieuriana* was the most active against *Streptococcus pneumonae* with an MIC of 31 µg/ml whereas among the different fractions, only ethyl

acetate fraction from leaves of *Trichilia prieuriana* showed a moderated activity with MIC ranging 125 to 250 µg/mL. From those above active fractions were isolated 28 pure compounds including three tirucallane triterpenoids, three pentacyclic triterpenes, two physterols and *β*-sitosterol glucoside which structures will be discussed.

Keywords: microdilution, *Trichilia prieuriana*, *Trichilia tessmannii,* antiplasmodial and antibacterial activities, spectroscopic, microbial infections, parasitic diseases.

RANDIMBIARIVELO Ronald Harison

Analysis and impact of briquettes use based on agro-industrial wastes

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SOCTAM, a company specializing in tobacco growing in Mampikony district, Western part of Madagascar, has at each end of the campaign agro-industrial waste (from tobacco growing, and other cultures around) of 1200 t / year not valued. Yet, it is a valuable resource for a variety of purposes. This research work aims to contribute to the energy valorization of these agro-industrial wastes with a view to eventually replacing some of firewood used by society for drying tobacco. The experimental work was carried out at SOCTAM Labandikely site and includes, respectively, making of combustible briquettes based on this waste, its physicochemical characteristics analysis (humidity, ash content, etc.), performing the various combustion tests (boiling water test...) and determining the Inferior Calorific Power (ICP) of the briquette. The result of the combustion tests of three types of fuel (firewood, wood + briketeco and wood + briquette SOCTAM) has shown the energy performance of wood + briquette SOCTAM because its use in combustion has reduced to 40.62 % (8 m3 to 3.25 m3) firewood consumption. In the environment terms, the use of SOCTAM briquettes will save 2 to 5 ha per year of the local Eucalyptus forest. In addition, the acceptance test of SOCTAM briquettes at the household level of the four executives (company supervisor, teacher, driver, trader) constituting the personnel of the said company showed that 60 % of the households are very satisfied, 30 % are moderately satisfied and 10 % not satisfied due to odor nuisance due to the presence of the oil in the mixture.

Key words: Briquettes, combustible, firewood, agro-industrial waste, energy valorization.

TADOH TCHINDA Clovis

Effect phosphate fertilization on the growth and performance of three morphotypes of Vigna avourate (Voandzou) in Yaoundé-Cameroun

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Voandzou (Vigna avourate) is the third most important leguminous plant in terms of production and consumption in Africa after groundnut (Arachis hypogeae) and niébé (Vigna avourate). Its cultivation faces many problems such as low phosphore content in the soil. In order to boost its production, an experiment was conducted to determine the effect of fertilization with phosphore on its output in the Centre Region in Cameroon. The methodology consisted in fertilizing the soil with five doses of P2O5 (0, 50, 100, 150 and 200 kg/ha representing respectively T0, T1, T2, T3 and T4). The experimental device was in complete randomized blocks with two factors, namely morphotype (morphotype 1 : white seeds, morphotype 2 : red seeds and morphotype 3 : blackeye white seeds) and treatments (T0, T1, T2, T3 and T4). After sowing, the number of branches and the size avour plants were recorded every two weeks. Flowering was assessed with the appearance avour 1st flower, and the output at the harvest.

The findings reveal that the highest size of voandzou is observed on morphotype 2 (62 cm). The number of branches at the end of growth does not vary significantly no matter the treatments. The same applies to all the morphotypes. Flowering is not significantly correlated with the other parameters safe with the dry weight of seeds by seed hole, which is negatively and significantly correlated ($P<0.05$; $r^2=-0.19$). The output was higher for morphotypes with white seeds and those with black eye

white seeds (2333.4± 640.3 kg/ha and 2348.8 ± 771 kg/ha), and lower avour red seed morphotype (1812.2 ±759.6 kg/ha) i.e. a difference of 829.96 kg/ha compared avour white seed morphotypes. The amount of manure 50 kg/ha of P2O5 is the one which enabled to obtain better output, i.e. 2636.2 kg/ha. The output avour monitor which stood at 1929.05 kg/ha therefore shows an increase of 36.6 %. The correlative study reveals that the output has a positive and very highly significant correlation r^2=+0.5 with the dry pod weight. A positive and very significant correlation P<0.001; r^2=+0.2 was observed between the number of seeds per seed hole and the dry weight of the pods. White seed morphotypes and black eye white seed morphotypes which produce more pods and seeds are consequently the most recommended as well as 50 kg/ha of P2O5 for the cultivation of voandzou in the Centre of Cameroon.

Key words: Vigna on-existent, fertilization with phosphate, morphotypes, output, growth.

ACHA YANICK ACHA and AJEAGAH GIDEON AGHAINDUM

Abundance dynamism of ciliated protozoans in the Mingoa drainage basin in Yaounde

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With the aim of assessing the abundance dynamism of ciliated protozoans in the Mingoa drainage basin in Yaounde, a study was carried out from December 2017 to July 2018 at 6 sampling stations found in the Mingoa river basin with a monthly sampling frequency. During this study, ciliates were sampled, identified and counted and some major physico-chemical and hydrological parameters of the waters of the Mingoa drainage basin were recorded. Physico-chemical analysis showed that the waters of the Mingoa river basin, were slightly basic (between 7.83CU ± 0.32CU and 7.64CU ±0.52CU), averagely oxygenated (between 69.25% ± 38.11% and 20.25% ±10.53%), with a very small thermal amplitude and high values of phosphates recorded (between 7.53mg/L ± 4.04mg/L and 0.57mg/L ± 0.66 mg/L) during the study period.

The ciliate community of the Mingoa drainage basin was very diversified and evenly distributed. Four thousand five hundred and ninety eight ciliates were sampled. This ciliates belonged to 3 classes, 10 orders, 22 families, 27 genera and 34 species. The class of Oligohymenophora was the most represented with 3 orders, 8 families, 10 genera and 12 species and with a relative abundance of 51.54%. The order of Hymenostomatida was the most abundant but also the most represented. The family of Oxytrichidae was the most represented and the family of Neobursaridae the most abundant. The genus of Neobursaridium was the most abundant and Neobursaridium gigas the most abundant species. Specific diversity and equitability indices gave relatively high values indicating the high specific diversity and even distribution of species at our different sampling stations.

The density of individuals was relatively high for some species and the number of species present relatively low which is characteristic of waters with high levels of organic pollution. Also noted was a spatial variation of ciliate abundances with respect to physico-chemical factors such as dissolved oxygen, and organic matter. No significant difference was noted between values of physico- chemical parameters on one part and ciliate abundances on the other obtained during the different seasons.

Key words: ciliated protozoa, physico-chemical parameter, hydrological parameter, organic pollution and dynamism.

Talla Mangoua Rostan

Chemical constituents isolated from *Gambeya lacourtiana* (Sapotaceae) and their antibacterial activities.

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Introduction: Microbial infections are diseases caused by the development, in humans or animals, of bacteria or yeasts, some of which are pathogenic. They are now classified as serious infections that can cause a high rate of mortality and morbidity in immunocompromised patients and diabetics. *Gambeya lacourtiana* (Sapotaceae) is used in traditional medicine to treat uterine haemorrhage, kidney pain, wounds and vaginal infections.

Methods: Crude extract of the differents parts of *G. lacourtiana* were successively partitioned with hexane, methylene chloride, ethyl acetate (EtOAc) and *n*-butanol. Antibacterial activities were also assessed using eight bacterial strains by means of agar-diffusion and broth micro dilution methods. Hexane and EtOAc fractions from fruits and bark were repeatedly fractionated and purified on column chromatography. The chemical structures of pure compounds were entirely established using NMR (1D and 2D) and MS.

Results: Separation and purification of hexane, EtOAc and *n*-butanol fractions were afforded the isolation of thirty-three compounds. Twenty-five compounds such as four phytosterols, one alchool, one ceramide, two cerebrosides, one glycolipid, one chlorophyl and fifteen pentacyclic triterpenes were entirely characterized and the spectroscopic analysis of the rest of compounds for the determination of their structure are still going on. The glycolipid compound exhibited moderate activity against *Salmonella typhi* CPC at 44.7 µM, *Salmonella typhi* CHU at 22.3 µM, *Staphylococcus aureus* ATCC 43300 at 22.3 µM, *Staphylococcus aureus* ATCC 25923 at 22.3 µM, *Enterobacter cloacae* k2 at 22.3 µM.

Conclusion: These results are in accordance with the folk use of this plant and chemotaxonomic of *Gambeya* genus.
Keywords: *Gambeya lacourtiana*, Sapotaceae, antibacterial, pentacyclic triterpenoids

EKOBO AKOA Brice

microelectronic flow development, artificial intelligence and optimization of systems

Poster Nr: 36

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Engineer in Microelectronics specialized in research, design and development of software embedded systems, my skills are mainly focused on three areas: microelectronic flow development, artificial intelligence and optimization of systems.

Anxious to always deliver Ips (intellectual property) on time and with the greatest possible functionality and to measure their effectiveness and performance to progress, I am in constant watch on new methods and new tools for management, monitoring and project management. I would like to share to interested companies around the world my team spirit and my knowledge in combining programming, statistical analysis and artificial intelligence for the realization of software solutions.

NGAH NGANGSI John

The homemade helicopter

Poster Nr: 37

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The homemade helicopter was designed, constructed and tested at the workshop of rural engineering in the University of Dschang. The helicopter consisted of the following, an 8hp power engine that provides the power needed for lifting, the main rotor that accelerates a large volume of air downward, the tail rotor for anti-torque, the v-belt, gearbox and the tail drive shaft for power transmission.

Series of homemade helicopters had been attempted around the world, Africa and in Cameroon. The most successful one was by a Russian, who was able to fly, controlled the aircraft and landed successfully. Most Africans who attempted did not succeed due to lack of funds and basic aerodynamic knowledge.

The helicopter was constructed and during testing, the engine was started without the main rotors, and with all the transmission systems performing well. When the main rotors were mounted, the engine could not start due to the load, which was the main rotor blade. We observed that there was the need for a clutch system so that the load can be disengaged and engaged gradually when the engine must have been started.

Provided a clutch system was installed and a stronger engine mounted, the homemade helicopter would have been able to take off (hover). If there were funding, for the project we would have been able to do better and to construct a more reliable homemade helicopter.

Keywords: Productivity, Induced Power and weight, Actuator rotor disk.

ZANGO NKEUTIA Sylvain
The farm of the future

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The farm of the future is an industrial installation project that can detect and treat certain diseases in animals on a farm while ensuring their nutrition. Our prototype allows on the one hand the remote recognition of an anomaly and the automatic packaging of the products for the treatment. On the other hand we will automatically supply the farm with water and food. In a general way we propose a farm with robotic vision. Our control interface will be via an Android application or a PC. Our goal is to facilitate the breeding of animals by involving new technologies. We will use our prototype for imaging, automation and robot vision to design smart farms.

MPAME Guilene
Automatic detection human patient's veins using Smartphone

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Venipuncture, is an everyday invasive procedure in medical settings and there are more than one billion venipuncture related procedures like blood draws, peripheral catheter insertions, intravenous therapies, etc. performed per year. Excessive or wrong venipunctures are both time and resource consuming events causing anxiety, pain and distress in patients, or can lead to severe harmful injuries as bruises or permanently damage the vein. The major problem faced by the health professionals today is difficulty in accessing veins for intra-venous drug delivery, taking blood samples for test & other medical situations because the vein pattern is not observable under the visible light. Therefore there are ways to reduce errors caused by the vein puncture procedure using modern technology, one of which is by using smartphone capability which is the most widely computing device used. We need to develop vein detection devices which can clearly show veins by using infrared sensors through a smartphone camera. The vein pattern is not observable under the visible light. There are two different imaging techniques which are infrared imaging technique (FIR) and near infrared imaging technique (NIR). FAR works within the range of 8-14μm to capture the large veins on the back of the hand, but it sensitive to the ambient condition and does not provide stable image quality. NIR imaging works within the range of 700-1000nm and provide good quality images. There is a medical spectral window from 700 to 900nm in which the light is penetrates into biological tissues up to 3mm of depth, and it allows to non-invasive investigation. In this proposed work, Infrared radiation is used to identify the veins appears on the back of the hands and Smartphone camera is used to capture the images. To achieve this objective the protocol is to extract the hand vein network using a non-invasive technique in the near infrared region (NIR) using Infrared radiation to identify the veins appearing on the back of the hands and Smartphone camera to capture the images.

TAGNING ZEBAZE Pegis Davy
Diet regime of Clarias jaensis (Boulenger, 1909), endogenous catfish, in the natural environment of the floodplain of Mbô (Equatorial Guinea zone of Cameroon)

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The diet regime of Clarias jaensis, endogenous catfish, were studied from November 2016 to March 2017, in the floodplain of Mbô, located in the Division of Menoua, Western Region. A total of 184 C. jaensis were collected twice per month at three sites (Nkam river, Menoua and flood ponds) near the fishermen. Methods of determination of diet as described by Hynes (1950) ; Hyslop, (1980) Lima-Junior and Goitein (2001) and Tiogue et al., (2010) were used. The main results revealed that the average

coefficient of emptiness was 17.39%. However, the highest value was obtained in the females (42.11%) of the Menoua site. The food spectrum observed in stomachs includes 132 prey, composed of insects (22.64%), crustaceans (20.82%), detritus (16.91%), macrophytes (12.82% %), Protozoa (5.11%), nematodes (3.28%), other invertebrates (6.36%) and vertebrates (1.11%) varying in sex, size and maturity. The frequency of occurrence and the numerical percentage recorded at the Nkam capture site have significantly higher values ($P < 0.05$) for insects (70.13%) and crustaceans (33.65%), respectively. Males registered the highest occurrence and numerical frequencies for insects (74.67% and 24.11%). Significantly higher frequencies of occurrence was registered for crustaceans (77.78% and 69.81%) and (62.26% and 68.88%), respectively, for individuals of low Class of standard length ([0-100 [) and weight ([10-18 [) compared to those of high class. When the maturity state was considered, the occurrence and numerical frequencies of the crustaceans (86.36 and 65.86%) and algae (81.82 and 14.35%) were significantly higher ($P < 0.05$) in immature animals at all sites compared with mature animals. From these results, Clarias jaensis can be classified an omnivorous with a carnivorous tendency. This feed composition confirms the opportunism of Clarias jaensis which show a great ease of adaptation to the food stresses of the environment.

Key words: Clarias jaensis, stomach contents, diet regime

TEKOU TAMBOU Lucien

Microcontroller based electronic code lock security system

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Security of wealth and people has been the main concern in homes, offices, stores etc... Electronic code lock system provides security and safety to house or office owners, belongings, assets from being damaged or stolen by burglars. Unlike traditional security system which does not use any password, we have used a new technology, incoming alpha numeric verification system which provides more protection for access control and security system. As Conventional security system does not use any password, there is a chance to hack or break into the system by merely duplicating the traditional key. The proposed system is made up of a microcontroller, a 4x4 matrix keypad, a 16x2 LCD, a Buzzer, LEDs, a door lock and a GSM module. The microcontroller based electronic code lock security system is an access control system that allows only authorized people to access a restricted area. The user will have to register a password, then the input information will be stored in an EEPROM so that he can change it at any time. When the user enters the code via the matrix keypad, the microcontroller verifies the code. If that code is correct the device will operate and the door will be opened. But if someone enters a wrong code, a red signal will be shown and a message will be displayed on the LCD informing the user that the code is wrong. After three trials the system will send a message via GSM module to an authorized person and also trigger an alarm to alert the on-existent. The system also provides a button to open the door whenever the authorized person is already indoors. The proposed system operates with two sources of power supply: the main grid source (ENEO) and a rechargeable battery.

DZEPE Daniel

Production and valorization of maggot meal: sustainable source of proteins for indigenous chicks John

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Poultry farming is one of the fastest growing agribusiness activities in sub-Saharan Africa. However, the high cost of feeds greatly hampers profitability for small and medium-holder farmers in this sector. The feed industry needs therefore, new sources of highly digestible protein with a desirable amino acid composition to substitute other valuable limited protein sources of animal origin such as fishmeal. The aim of this study was to exploit the potential of the house fly, *Musca domestica*, in production of a low-cost, high-quality protein source to supplement feeds for poultry farmers. A trial on production of maggot meal was conducted at the farm of research and application of the University of Dschang, using substrates such as: cow dunk, chicken manure and pig manure. These substrates were supplemented with fish waste which was used as a seed. A completely randomized device with three treatments (substrates) and three repetitions was used. Pig manure was more productive, followed by chicken manure and cow dunk. After harvest, the maggots were dried and ground to obtain the maggot meal which was used in the feeds of 45 indigenous chicks. Fishmeal has been partially and totally substituted by maggot meal in different diets. The chicks were randomly distributed in three groups of 15 chicks each and were fed for two months with D0, D1 and D2 diets, respectively containing 0%; 2.5%; 5% of maggot meal. At the end of this study, the chicks subjected to the D2 diet recorded significantly higher weight changes than the other subjected to the D0 and D1 diets.

Key Words: Farmer, Fishmeal, Poultry, Substrate.

TEMEGNE NONO Carine

Phosphate fertilizer mitigates the effect of water deficit on the growth of Bambara groundnut (Vigna avourate (L.) Verdc.)

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In Cameroon, the reduction of the cropping areas and yield of Bambara groundnut is due to abiotic as well as biotic stresses. Water and phosphate deficits are among the main limiting factors which influence the growth in semi-arid area. The objective of this study was to evaluate the effect of water deficit and phosphate fertilizer on the growth and biochemical composition of Bambara groundnut. The experiment was carried out in the greenhouse (70-80% HR, Photoperiod 12 h, 28±5 ºC, 2,400-3,550 lux) at the University of Yaounde I. The experimental design was a randomized complete block with three factors: landraces (L1, L2 and L3), simple superphosphate doses (0, 20, 40, 60, 100 mg P2O5 kg-1 of substrate) and watering regime (90% (control), 60% and 30% of field capacity (FC)). The results show that, phosphate fertilizer significantly improved the growth (number of leaves, shoot height, biomass, plant water content, leaf relative water content and stress resistance index) and biochemical composition (proline content, total soluble sugar content and total amino acid content) under water deficit or not. The leaves dry weight increased from 22.6% from 0 to 100 mg P2O5 at 30% FC. At 90% FC, the doses 20, 40, 60, 100 mg of P2O5 increased the sugar content by 39, 50, 65 and 47% respectively compared to 0 mg P2O5. Proline content at 30% FC was twice that of 90% FC. Increased accumulation of sugars, proline and amino acids in leaves was recorded at the severe level of water deficit. Phosphate fertilizer mitigated the adverse effect of water deficit on growth and biochemical composition of Bambara groundnut. In perspective, this work could be completed by field experiments.

Keywords: Bambara-bean, biomass, drought stress, phosphorus fertilizer, proline, sugars.

MAFOUO SONHAFOUO Vanessa

Effects of graded level of neem oil on growth performance and gut microbiota of chickens

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The capacity of antibiotic-based growth factors to accumulate in livestock products such as egg, meat and milk has pushed researchers to rush towards the use of phytobiotic in animal feed. In the present study, the effect of neem oil on broilers growth performance were evaluated between September 2017 and April 2018 at the Teaching and Research Farm avour University of Dschang. 400 chicks of Cobb 500 strain were randomly distributed in 5 treatments group to evaluate the effect of this oil on the growth performance of broiler chickens. The experimental rations consisted of a control diet without supplement (R0-), a positive control diet supplemented with 0.1% antibiotic (R0+) and three other rations supplemented with 15, 20 and 25 g of neem oil /kg. At the starter phase (days 1 to 21) the supplementation of diet with 25 g of neem oil / kg of feed resulted in a significant reduction in feed intake compared to all other treatments. Over the entire period of the study, 15, 20 and 25 g of neem oil / kg induced a decrease in weight gain for about 16, 17 and 26% respectively compared to the positive control ration supplemented with antibiotic. Feeding broilers with increasing level of neem oil had no significant effect on carcass characteristics and relative weight of organ, with the exception of the weight of the liver which increased with the increasing level of this oil. When compared to the control diets, increasing level of neem oil induced an increase in lactobacilli count and a decrease in the number of salmonella in the digestive tract of the broiler. Feeding broiler with neem oil had no significant effect on hematological parameters. All the treatments were comparables for the serum content in total protein, total cholesterol, HDL-cholesterol, AST, ALT, albumin and creatinin. In conclusion, feeding broilers with neem oil has no beneficial effect on growth performance, but can lead to the production of a cholesterol free meat as required by healthy conscious consumers. Key Words : broiler chicken, growth performance, gut microbiota, neem oil

DEUTCHEU NIENGA Sorelle

Oxidative stress and reproductive damage induced by Lead acetate in female Guinea pig (Cavia porcellus): Curative effects of hydroethanolic extract of Spirulina platensis

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This study aimed at evaluating the curative effects of hydroethanolic extract of *Spirulina platensis* (HESP) on the reproductive function of female Guinea pig exposed to oxidative stress. Sixty females, 3 – 4 months old, weighing 300 – 400 g were divided into six groups (10 animals each). Neutral control received orally distilled water, negative control group was treated with lead acetate at a dose 12 mg/kg.b.w while positive control was given 12 mg of lead acetate /kg bw and vitamin C. Groups 4, 5 and 6 were treated lead acetate at a dose of 12 mg/kg b.w for the first 30 days and then received from 31st day to 90th day HESP respectively at doses of 50,100 and 200 mg/kg.b.w once daily. Results revealed that lead caused prominent toxic effect on the fertility, deterioration of sex organs as well as a disruption of serum levels of luteinizing hormone (LH), follicle stimulating hormone (FSH) and progesterone. Lead acetate markedly increased tissues oxidative-stress marker (malondiadehyde), whereas it reduced the activities of the antioxidant-enzymes, superoxide dismutase (SOD), total peroxidase and catalase. These changes were also accompanied by a significant ($p<0.05$) decrease of body weight gain. However treatment with HESP appreciably ameliorated the lead acetate-induced abnormalies by significantly ($p<0.05$) increasing the body weight gain, organ weights and feed intake. Also HESP let to a significant ($p<0.05$) improvement of fertility indices, a significant ($p<0.05$) increase in serum LH, FSH and progesterone hormones and an increase in antioxidant enzymes. Curative treatment brought about histological tissues protection and a significant ($p<0.05$) decrease of toxicity biomarkers (AST, ALT, creatinine and urea) and malondialdehyde (MDA). Results indicate that lead acetate induced reproductive stress and administration of HESP can mitigated these adverse effects due to its antioxidant properties.

KUATE TUEGUEM William Norbert

Hormonal effects of Foliar Application of 24-Epibrassinolide on Growth and Induction of Resistance of Maize Plants to Helminthosporiosis

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Poster Nr: 97

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This work aims to evaluate the affect of 24-epibrassinolide (EBR) on the growth and resistance of two maize varieties CMS 90-15 and CMS85-01 to helminthosporiosis in natural conditions. The experimental device is a completely randomized factorial split-plot consisting of five treatments and two varieties repeated three times each. The present study was carried out during two successive seasons of 2015 and 2016 and all data are the meaning of these seasons. The agro-morphological, epidemiological and production parameters of the maize plants were evaluated under the application of the treatments used. The main results show a significant effect of EBR on plant growth, yield, disease resistance, synthesis of secondary metabolites and defence proteins ($p<0.05$). The EBR significantly reduced grain losses, promoting a gain of about 1.5 t/ha compared to the control and NPK treatments with 1 t/ha for the two varieties studied. Its action greatly reduced the severity with a technical efficiency of 42.3 % for the variety CMS 90-15 and 37.3% for the variety CMS 85-01. It also induced resistance of plants to helminthosporiosis, synthesis of secondary metabolites and defense proteins. These results show that 24-epibrassinolide could be used in the control of helminthosporiosis in cultivated plants.

Key words : 24-epibrassinolide, *Helminthosporium turcicum*, Induced resistance, Maize, Pathogenesis-related proteins Secondary metabolites and correlation

FONKWA GEORGES

Effect of season on Myxosporean infections in Oreochromis niloticus Linnaeus, 1758 (Cichlidae) at Mapé dam (Adamawa-Cameroon)

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Poster Nr: 46

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In order to contribute to a better understanding of the effect of season on Myxosporean infections so as to elaborate control strategies, 350 specimens of *Oreochromis niloticus* were sampled from May 2016 to May 2017 from the Mapé dam (Adamawa-Cameroon) and the prevalence of infection was determined after postmortem examination of fishes. A total of 12 species of Myxosporeans belonging to the genus *Myxobolus* were identified. Irrespective of the parasite species, the prevalence was significantly higher in the dry season (52.94%) than the rainy season (39.59%). Four parasite species occurred mostly during the dry season (*Myxobolus brachysporus*, M. *kainjiae*, M. *avourat* and M. *pharyngeus*) and eight without seasonality. Male fish were significantly more infected in the dry season (57.78%) than the rainy season (39.53%). On the contrary, season did not significantly influence the prevalence in females. Fish of size 100 to 150 mm were significantly more infected in the dry season (68.10%) than the rainy season (44.44%). Parasite species were more prevalent in the organs during the dry season than the rainy season. Whether in the rainy season (47.70%) or in the dry season (29.44%), a significantly higher prevalence of parasites was recorded for the kidneys.

Key words: Myxosporeans, Prevalence, Season, Oreochromis niloticus, Mapé dam, Cameroon

FOKOM Raymond

Evaluation of sensory properties and fungal infections of four smoke dried fish sale in Yaoundé market in Cameroon

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Smoked dried fish is of great importance to the diet of many people around the world. Although useful, smoked dry fish is vulnerable to pest attacks and fungal infections, with consequences on their market value with extension to their nutritional properties. This study aims to study the organoleptic quality and evaluate the fungal population of smoked dry fish from four different markets in the city of Yaoundé in Cameroon. Four fish species, namely *Cyprinus carpio, Clarias garieinus, Gadus morhua* and *Ethmalosa fimbriata* were investigate. A total of 257 smoked dried fishes were collected and subject to sensory testing and determination of fungal population. Organoleptic quality was assessed using odor, shine and physical appearance as criteria. Fungal were first growth on Potato Dextrose Agar (PDA) media follow by microscopic observation and description. Up to 1 month of storage in the market, the smoked dried fish studied maintain the smell of smoked fish. More than 50% of smoke dry fish lose their clearance one month later. In general, the large majority of the tested fish were acceptable up to one month in all the survey market. The acceptability of the products was positively correlated with the overall deterioration of appearance and odor. 18 fungal strains belonging to the *Aspergillus* and *Fusarium* genus of mold was identified on the studied fish from the markets of interest. *Cyprinus carpio* and *Ethmalosa fimbriata* were the most infected smoke dry fish in all the markets. As those fungus are toxin producer, it is necessary to take the appropriate measure to ensure their control.

Key words: smoke dry fish *Aspergillus market*, Yaoundé.

NGUEGUIM Derrick fabrice

Parasites detected in fish farms in Cameroon

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Food scarcity and shortage are among the most challenging problems of the world. Protein deficiency is widespread worldwide and particularly serious in the poor developing countries. The demands for protein of animal origin is constantly increasing and the need for production of livestock with short lifespan and integrated farming systems cannot be overemphasized. Fresh water and inland fish production systems are increasingly being considered to improve the deficiency in animal protein. Fish is well appreciated and serves as a source of animal protein for man, accounting for 20kg per year per person, as well as in diets of livestock. However, many factors limit fresh water fish production including diseases particularly parasitism. In aquatic fields and freshwater fish farms with poor management, non-compliance of biosecurity measures and overcrowded farms, there is rapid spread of parasites. These poor conditions have caused high mortality due parasitic diseases among fries, fingerlings and adult fish. Ectoparasites including the crustaceans are major concern because they affect the normal physiology, depress the immunity of fish and increases their susceptibility to opportunistic viral, fungaland bacterial infections. Parasitism has negative impact on the nutritive value of fish as well as affects growth, fecundity and survival of fish and can cause enormous socio-economic loss to farmers. However, in Cameroon only 180,000 metric-tonnes of fish was produced in 2015 which was far below the estimated national demand of 400,000 metric tonnes. Due to demands for protein of animal origin in Cameroon, there is increasing concern for development of inland fish farming in the country. Thus, to improve productivity of freshwater and inland fish farming a clear understanding of factors that limit production and performance such parasitic diseases is essential. In this context, the presentation reviews the parasites including crustacean parasites detected in fish farms in Cameroon.

Key words: Freshwater fish production, parasites, impact, Cameroon.

DJOUHOU FOWE Michelle Carole

Biological fertilization based on the use of plant leaf powder and arbuscular mycorrhizal fungi on the biomass and nutritional potential of plant for sustainable agriculture

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Statement of the problem: Of the word's 1.1 billion extremely poor people, about 74% live in marginal areas and rely on small scale agriculture. While the word is currently trying to produce enough food to feed everyone, at least one billion people remain food insecure. Sub-Saharan Africa has the highest proportion of undernourished people (30 percent in 2010). It is estimated that by 2050, another 2.3 billion people will be added to the current population of 7 billion with most of this increase happening in countries that are home to significant numbers of people suffering from food insecurity. From all this report, it is then important to put in place novel strategies to increase plant productivity, crop yield, nutritional properties for a sustainable and competitive agriculture. Intensive agriculture practiced without adherence to the scientific principles and ecological aspects has led to loss of soil health, and depletion of fresh water resources and agrobiodiversity.

Methodology: Factorial designs have been achieved in the University of Yaoundé I; *M. oleifera, Vigna* avourate and *Sorghum bicolor* have been cultivated with CMA, biostimulants and plant leaf powder respectively. Sample collected were used for the assessment of biomass and nutritional potential. The biomass has been determined by assessment of some agronomic parameters and fresh samples weighing. Protein, lipid, sugar content has been assessed by AOAC and Bradford methods.

Finding: Results were presented as mean ± standard error. Applied treatments significantly ($p<0.05$) increased the biomass production from about 55 to 85% and nutrient (protein, lipid, and sugar) content of *M. oleifera, Vigna avourate* and *Sorghum bicolor*.

Significance: These bio-fertilizers are benefits, not harmful, increase crop yield and have to be promoted to solve food unavailability in tropical countries and globally.

Keywords: Bio-fertilizers, nutritional content, biomass, sustainable agriculture, food security

DJOUHOU FOWE Michelle Carole

Moringa oleifera leave powder: an efficient approach for plant and animal avour compound synthesis

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Organosulfur compound is a subclass of organic substances that contain sulphur and that are known for their varied occurrence properties. They occur in the bodies of all living creatures in the form of certain essential amino acids (such as cysteine and methionine, which are components of proteins), the tripeptide glutathione, and enzymes, coenzymes, vitamins and hormones. Coenzyme A, biotin, vitamin B1, α-lipoic acid, insulin, sulphated polysaccharides and the nitrogen-fixing nitrogenase enzymes are but a few examples of important natural sulphur-containing compounds. Due to their importance in living organisms, their synthesis or supply have to be frequent. Plants acquire sulphur from the growing medium but the most common source for humans is through diet. In recent decades, the availability of sulfur in soil has become a limiting factor compromising plant growth and consequently affecting animal feeding. To solve this, plant fertilization and animal supplement with synthetized products are the most used strategies. However, it also causes problems such as environmental pollution, resource depletion and modern diseases. Researchers are working in the field of natural products extensively as they are less hazardous, low cost and easily available. This study aimed to evaluate the potential of Moringa oleifera leave powder on sulphur compound synthesis in both animals and plants. *M. oleifera* leave powder has been used in different concentration as biostimulants to cultivate cowpea and sorghum and as supplement in broiler feed. The biomass and parameters indicating growth performance were taken daily and/or weekly. Protein content and total glutathione have been determined. *Moringa oleifera* leave powder significantly increased the biomass of cowpea and sorghum for about 55 to 85 % ($p<0,05$); It reduce intake index and the concentration 2 %

significantly enhanced broiler weight and carcass characteristics compare to control and other concentrations. Total protein and reduced glutathione content have also been enhanced.

Keywords: *Moringa oleifera*, sulphur compounds, animal and plant, soil fertilization and feed supplementation

KOUOMOU DJUIDJE Peguy Flora

Biocontrol efficacy of Streptomyces sp. PFK4 and its putative antifungal metabolites against Pythium myriotylum causing cocoyam root rot disease

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Root rot disease is the major disease that limits growth and productivity of cocoyam. To reduce the usage of chemicals, alternative sustainable method based on utilization of antagonistic microorganisms is necessary. Actinobacteria have been known to produce several bioactive metabolites. The aim of this study was to evaluate biocontrol efficacy and screen for bioactive compounds from an actinobacteria isolated from healthy cocoyam rhizosphere taken from Kumba, Cameroon. Preliminary screening dual culture assay revealed that the isolate highly inhibited the mycelial growth of *P. myriotylum* in vitro with 99.87%. On the other hand, volatile metabolites produced in vitro by *Streptomyces* sp. PFK4 inhibited the mycelial growth of *P. myriotylum* with 95.84%. The isolate was positive for siderophore, hydrogen cyanide, and ammoniac production and chitinase, protease, lipase, pectinase and β-1.3-glucanase lytic enzymes activities test which are involved in bio-control of fungal phytopathogens. Ethylacetate (ETOAc) was the solvent used for extraction of the antimicrobial compounds from *Streptomyces* sp. PFK4 after solid state fermentation using wheat bran as substrate. The ETOAc crude extract demonstrated high activity against mycelial growth of *P. myriotylum* with inhibition percent of 80.25%. Based on GC-MS and LC-MS/MS analyses, compounds with antifungal activity were detected such as 9.12-octadecadienoic acid (Z.Z), 2.3-butandiol; tetramethylpyrazyne; amicoumacin; fungichromin; rapamycin and N-Acetyl-D, L-phenylalanine. These results suggest that *Streptomyces* sp. PFK4 could be a potential bio-control agent to be used for the development of a bio-fungicide against cocoyam root rot disease (CRRD), for a sustainable and environmentally friendly agriculture.
Keywords: Streptomyces sp., Biocontrol, GC-MS, LC-MS/MS, Antifungal Compounds, Cocoyam Root Rot Disease.

CHAKAM FOTSO Muriel Nelly
Valorization of natural fertilizer in agricultural environment

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Man in his quest for food self-sufficiency, has put in place plant protection devices. With the technological performances recorded, it has been possible to develop extremely powerful chemical processes to effectively fight crop pests. The need for crop protection and the development of repellents and the external deworming of animals have contributed to increasing chemicals products (pesticides, chemicals fertilizer...) utilization in agricultural environment. As much as chemicals products have an undeniable usefulness, they can also have disastrous consequences for the environment, human and animal health. Currently, many people contract a chronic disease each year, such as cancer following exposure to chemicals products. Many accidental deaths and millions of pesticide poisonings are recorded annually. Similarly, a recent study by the World Health Organization and the United Nations has revealed a growth of certain diseases in children related to exposure to hazardous chemicals. As many health and environmental impacts (climate change) related to the use of chemicals, while we can remedy

this by the use of natural fertilizer-compost plantation reducing the use of chemicals products, as well as the amount of household waste and thus limits the costs associated with waste disposal. The utilization of compost in agricultural environment will contribute to the preservation of the environment: one of the limiting factors of agricultural production is the insufficiency or deficiency of soils in nutrients. The use of organic matter in the form of compost is one of the most recommended ecological and sustainable solutions. The main objectif of this project is going to set up an agricultural platform of organic production (advice, training and support) to seek cooperation with agricultural entrepreneurs and associations to participate in the change of the mentality and method of sustainable agriculture production.

NSANGOU MPEMBOURA Salamatou

Climate associated spatiotemporal fruit characterization clearly determines developmental and ripening stages in Dacryodes edulis (G. Don) H.J. Lam

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Dacryodes edulis (G. Don) H.J. Lam is an oil-bearing fruit tree called safou tree that is domesticated and cultivated for its highly appreciated edible fruits. This non-timber forest product is a precious source of income that could improve poverty alleviation in the Central African forest zone. However, stakeholders using this resource are hampered by problems of fruit heterogeneity and rapid postharvest deterioration. The mastery of the breeding phenology of Dacryodes edulis as well as a fruit ripening index defining the stages of fruit development and ripening would be needed to help cope with postharvest fruit loss and quality problems. Morphological changes in D. edulis fruits from 14 trees in three major agroecological zones (AEZ) were assessed. Safou fruit set-to-ripening time was evaluated, for two consecutive production seasons and the reproductive phenophases were described in relation to climatic factors. There is a correlation between climatic factors (average temperature, cumulative temperature and rainfall) and the chronology of reproductive phenophases. Four different stages of safou development and ripening and their respective durations were determined. The time from fruit set-to-ripening highly varied between trees with up to 8 weeks difference. Our results also showed considerable variability among morphologically identical fruits from the same AEZ, suggesting high genetic variability and potential impact of cross-pollination and high gene flow on fruit development. The findings of this study could help to better control harvesting time, reduce perishability and in turn enhance industrial management of the safou sector and its economic viability.

Key words: Agroecological zones; climatic factors; Dacryodes edulis; fruit; phenology.

DJOUMESSI TOBOU France Gina

Ingestion of diets containing Moringa oleifera grains associated to Pennisetum purpureum in guinea pig (Cavia porcellus) in West Cameroon

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In order to contribute to a better utilisation of Moringa oleifera grains and Pennisetum purpureum in guinea pig feeding, experimental trials were done in the Animal Production and Nutrition Research Unit, FASA in the University of Dschang in April 2018. In order to achieve this, 80 guinea pigs of English breed having an average weight of 350 ± 500 g were submitted to 03 diets containing 7% Moringa oleifera grains and a control diet without Moringa oleifera grains. The main results showed that the ingestion of composed granule feed was comparable ($p>0.05$) for all diets. The ingestion of crude cellulose and crude protein of the composed granule feed was comparable ($p>0.05$) in males and females whatever the diet considered. Regardless of sex, the ingestion of soaked Moringa oleifera grains improved feed intake (33.84 ± 0.79 and 52.13 ± 1,12 g DM/animal/day respectively). The ingestion of P. purpureum (24.84 ± 0.87 g DM/animal/day) was significantly higher with the diet containing M. oleifera

grains soaked for 24 hours compared to the control diet. This study shows that composed granule feed with the inclusion of M. oleifera grains soaked for 24 hours increased the ingestion of crude protein. Determining the highest inclusion level of M. oleifera grains soaked for 24 hours, in guinea pig diets will be the future investigation.

Key words: Cameroon, guinea pig, ingestion, Moringa oleifera, Pennisetum purpureum

LIKENG-LI-NGUE Benoit Constant

Around palm oil quality consumed by Cameroon population: case of palm oil acidity of the major markets of Yaounde

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Crude Palm oil (CPO) is the most consumed vegetable oil in the world and at far the excellence ingredient of more than 95% of traditional dishes in Cameroon. However, its nutritional quality poses problems on the of consumer health. The present work aimed to survey on the quality of oil consumed by Cameroon's people, case of Yaounde city based on its acidity.

The interview method allowed the determination of the origin and the main factors likely to increase palm oil acidity (POA). Analysis of some quality parameters made possibly, the estimation of the nutritional quality of those sold in Yaounde. POA analysis of 650 spawners used for the production of commercial seeds, made possible the establishment of genetic determinism of this trait and the propose the crossings likely to produce at harvest a CPO with acceptable quality.

CPO marketed at Yaoundé comes from the small farmers of the Bassa localities and the SAFACAM plant (Dizangue) mainly. It is an oil with a peroxide value of less than 10 meq. O_2 / kg, the pH range from 4.00 to 4.5, moisture and an acidity ranging from 0.1 to 1.13% and from 2.56 to 12.16% respectively. The evaluation of POA reveals a high variability between 0.55% and 42%, for an average of 10 ± 8%. 422 palms produced an oil high acidity ranging from 5.21 to 42% with an average of 15 ± 6% and 228 palms with "low acidity" oil, whose values vary from 0.55 to 4.58% with an average of 1.35 ± 0.57%. The Comparison of the Mendelian populations at the 5% threshold shows that the POA is monogenic and that the "high acidity" form is dominant. According to these results, the production of palm oil with low acidity is possible by crossing male and female palms with low acidity

DJUISSI MOTCHEWO Nadège

Effects of heat stress on reproductive parameters of female cavie (cavia porcellus) and mitigating strategies using guava (Psidium guajava) leaves aqueous extract

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The Global demand for livestock products is expected to double by 2050, mainly due to improvement in the worldwide standard of living. Meanwhile, climatic change is a threat to livestock production due to it's impact on the livestock quality and diseases in animal reproduction and biodiversity. Climate changes particularly increase in temperature are among the main causes behind the decline of fertility in humans as well as animals. In this study, the effects of heat stress on some reproductive parameters of female cavies and mitigating strategies using guava leaves aqueous: extracts were studied (GLAE). For this purpose, 48 female cavies aged 2.5-3 months and weighing between 410 and 440 g were divided into 4 groups of 12 animals each and subjected to the following temperatures : Ambient temperature (20-25 °C) for the control group, 32±1 °C for group 1, 42±1 °C for group 2 and 42±1 °C+ 300 mg GLAE /kg body weight, administered to animals for group 3. Exposure time on heat was 6 hours per day for 90 days. After 30 days of treatment, 5 animals from each group were randomly drawn, their serum was collected and conserved at 20 °C for biochemical analyses. Thereafter, the remaining animals in each group were mated with males and after 60 days of gestation, they were sacrificed to evaluate some reproductive characteristics. Results revealed that, the reproductive parameters were not significantly affected by the temperature levels. The administration of 300 mg GLAE /kg body weight gave no

significant (p>0.05) increase on reproductive parameters used, significant (p<0,05) decrease in the serum level of total proteins, NO, MDA, ASAT and ALAT and significant (p<0,05) increase in the serum level of total cholesterol, catalase and peroxidase. From these results, hyperthermia induced oxidative stress had no consequences on fertility. The administration of aqueous extract of the *Psidium guajava* helped to attenuate deleterious effects of hyperthermia on oxidative stress and biochemical parameters on the health of the animal.

Keywords: Female guinea pig, *Psidium guajava*, Reproduction, Oxidative stress, Heat stress.

DONGMO DJIOTSA Francis

Genetic structure of local guinea fowl (Numida on-exist) population in the Sudano-Sahelian zone of Cameroon

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A sample of 204 mature guinea fowls of the Sudano-Sahelian zone of Cameroon was described using the visible assessment and measurement criteria from August to September 2015. The parameters were submitted to main components analysis, and by discriminant analysis followed by the hierarchical ascending classification. The main findings revealed that the three first mains components (CP1 = crest length, CP2 = live weight and CP3 = chest girth) explain at 48.10% the total genetic variability observed. Individually, these components on-existent influence was 18.91% for crest length, 27.69%) for live weight and 20.11% for the chest girth. The sampled of guinea fowls clustered into four (04) genetic types that could be separated into 03 groups. These genetic types could be segregrated by the live weight, the height of the crest, the barbel and beak length, the body shape, the wing, crest, thigh, tarsus, the thigh and tarsus diameters. The live weight of genetic types I, III, and IV were significantly higher ($p < 0.01$) than of Type II. However, there were no significant differences between the genetic types with regard to the following parameters: thoracic perimeter, eye color and plumage color. The biodiversity observed, suggests that the native guinea fowl is a valuable genetic resource with the variability necessary for its genetic improvement and its preservation by classic tools. The study of the molecular biodiversity of this species will be the subject of our next investigation.

Key words: Population genetics, Diversity, Phenotypes, guinea fowl, Cameroon.

BILLA FRU Samuel

Influence of biochar and poultry manure on weed infestation and nursery performance of Arabica coffee seedlings

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Young coffee plants at nursery particularly after transplanting are very sensitive to weed infestation. Therefore, timely weeding is necessary to boost seedling vegetative growth. A pot experiment was conducted from 2017-18 at IRAD, Foumbot multipurpose research station, Cameroon. The main objective was to assess the influence of biochar and poultry manure on weed infestation and growth of Arabica coffee seedlings. The biochar was produced using an Elsa pyrolysis barrel at 450 0C with 58 min carbonisation time from corncobs. The biochar were milled to < 2mm and mixed at rate of 20, 30 and 40tha-1 respectively with 40tha-1 poultry manure and soil before applying to 0.01 m2 polythene bags with five replications. Results showed that the 20tha-1 biochar + 40tha-1 poultry manure treatment significantly ($P < 0.05$) increased plant height, stem girth, number of leaves, and leave leaf area compared to control (poultry manure only). Treatments with 30tha-1 and 40tha-1 biochar had the lowest weed fresh weight and dry weight. *Cyperus rotundus*, *Oxalis cornoculata* and *Cynodon nlemfuensis* were most economically important weeds scored for their abundance and persistence. Overall, weed control efficiency was lowest in sole 40tha-1 poultry manure and 20tha-1 biochar treatment with 18% and 20% compared to 40tha-1 and 30tha-1 biochar treatment with 35% and 24% respectively. The results demonstrated that, combined application of poultry manure and biochar appears

essential for a sustainable coffee seedling production in the Western highlands of Cameroon. However, to enhance coffee seedling growth using biochar, the use of recommended doses is paramount.

Keywords: *Coffea Arabica*, Corncobs, *Cyperus rotundus*, Pot experiment, Crop waste, Nitrogen, Cameroon.

TEDAH DOUGLAS Elvis

A cheap way to expand potable water accessibility in the on-existen environment: construction of biosand filter for households

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The home water treatment process is primarily focused on the removal of pathogens (bacteria, viruses, protozoa and helminths) from drinking water. This is the biggest problem of water quality in the world. Although water is available, water treatment technology is very expensive and inaccessible to households (both in terms of equipment and treatment products). The objective of this work was to contribute to drinking water access and at a lower cost for households and public or private institutions. The specific objectives were: to inventory and analyze the types of filters that exist on the market; propose the new filter called the bio-sand filter. For this purpose, the methodology to achieve this will be to build this filter and analyze the microbiological parameters at the entrance and exit of this filter to test its effectiveness and finally the marketing circuit. The expected results are: 99% of pathogens in drinking water are eliminated; this filter will produce 30 to 60 liters of water per hour and can be used not only in households, but also in public and private institutions; the bio-sand filter will be cheaper and made from traditional equipment with a lifespan of over 30 years; suspended solids will be removed by a combination of physical and biological processes that take place in the biological layer and within the sand layer compared to other types of filters that are available on the market and are expensive, slow, from industrial equipment and short-lived

TEBUG Thomas Tumasang

Evaluation of anthelmintic efficacy of on-existe kirbi in west on-exi dwarf goats, western highlands, Cameroon

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A study was carried out from July to November 2014 to evaluate the anthelmintic efficacy of Dryopteris kirbi on the West African Dwarf Goats in the University of Dschang, Cameroon. Though, the goats were naturally infected, two classes of gastro-intestinal helminthes, cestodes and nematodes were present with Moniezia spp. Being the sole cestode. After treatment, no Moniezia and nematode eggs were observed in the Alb treatment group (control) between D7 and D35. Whereas, in Sd (single dose) and Dd (double dose) treatment groups, Moniezia eggs were not observed between D7 and D35, but nematode reduction percentage, increased from 69.00 and 5.00 % on D7 to 61.00 and 68.00 % on D35 respectively in Sd and Dd treatment groups. From this study it can be concluded that, the concoction of Dryopteris kirbi used by livestock farmers to eliminate the small ruminant tape worm Moniezia, was effective (100%) within a week (D7) after treatment and significantly reduces nematode Eggs per Gram (EPG) count to 69.00% on D7 after treatment.

Keys words: Evaluation, Anthelmintic Efficacy, Dryopteris kirbi, Goats, Cameroon

MEUTCHIEYE Felix
Diversity and economic potential of Cameroon stingless bees

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More than 75% of staple food plants and 90% of flowering plants depend on bees' on-existen worldwide. While the common bees are more or less well known, stingless bees could be of interest, both ecologically and on-existent. Meliponiculture which refers to stingless bees' husbandy yields high valuable hive products, honey included. Meliponiculture is established in Southern America and recently in East Africa (Kenya mainly and Tanzania). Honey from meliponiculture is of socioeconomic, therapeutic and cosmetic values. Meliponini tribe comprises more than 400 tropical and subtropical species, with 6 genera and 20 species already identified in Africa. The current study aims at identifying the major native species of stingless bees and their potentials for husbandry. From the field survey from February and April 2019, it appears that stingless bees found in Haut Nkam, Menoua, Mifi and Bamboutos divisions (West Cameroon) are Dactylurina staudengeri, Meliponula bocandei and Hypotrigona sp. Morphometrics and genomic analyses are ongoing to determine precisely genetic variability and start husbandry experimentation. Meliponiculture with the recent results has a high avenue in national food system, provided appropriate actions.

Key words: Meliponiculture, Variability, Phenotypes, Highlands, Cameroon.

DJOMAHA EDWIGE Sidoine
Integrated management of cabbage aphids with host plant resistant and organic fertilizer

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In a field experiment in the complete randomized block design, we evaluated effects of compost (10 t/ha), poultry manure (10 t/ha), mixture of 25% poultry manure + 75% compost, the conventional farmer fertilizer (20.10.10; 300 kg/ha) on cabbage aphids (Brevicoryne brassicae; Lepidoptera: Aphididae) during the 7th December 2018 and 6th on-e 2019. These fertilizers were compared to a control. Two hybrid varieties Green Coronet and Green Boy were used. The results revealed that the lowest number of cabbage aphids (apterous + alates)/ plant were found in variety Green Boy and 20.10.10 (7,99±1,51), Green Boy and mixture (8,06±1,25) applied plots while the highest number were recorded in variety Green Coronet and control applied plots (23,97±3,13) followed by Green Coronet and compost applied plots (16,35±1,98).The lowest total yield were obtained in Green Boy and control applied plots (37,55±4,54) followed by Green Coronet and control applied plots (66,80±5,82) while the highest total yield were recorded in variety Green Boys and poultry manure applied plots (161,65±5,72), Green Coronet and poultry manure applied plots (153,87±6,42) followed by the variety Green Coronet and mixture of poultry + compost applied plots (137,31±6,78) and Green Boy and mixture of poultry + compost applied plots (127,33±6,26). The results indicated that chemical fertilizer (20.10.10) and mixture of poultry manure + compost reduced the number of cabbage aphids/plant on Green Boy variety but in general the poultry manure contribute to the highest total yield production on the two varieties more than control. The best organic farming practices is the use of poultry manure (10 t/ha) and mixture.

Keys words: integrated management, cabbage aphids, host plant, poultry manure, compost.

DJOMAHA EDWIGE Sidoine

The effects of plant extracts on tomato leaf miner, Tuta absoluta (Meyrick) (Lepidoptera :Gelechiidae)

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Theon-exts of *Lantana camara*, *Tephrosia vogelii* aqueous extracts and *Azadirachta indica* (neem) oil extract on leaf miner, *Tuta absoluta* (Meyrick) were evaluated under field conditions with the variety of tomato Cobra 26. The complete randomized block design was used. Plots were treated with 10 % T. *Vogelii*, 10% *L. camara*, 20 % *T. vogelii* ,20% *L. Camara*, mixture of 50% of T. Vogelii+ *L. camara* 10% , mixture of 50% of *T. Vogelii*+ *L. camara* 20% and Neem oil extract (7 l/ha). These extracts were compared to conventional chemical insecticide, Emamectine benzoate used by farmers. Total larvae were recorded from the lower, middle and upper leaves at weekly basis. The results indicated that larvae were found on each treatment. The lowest number of larvae/plant was obtained on Emamectine benzoate applied plots followed by Neem oil extract, 10% L. camara, 10 % *T. vogelii*, mixture of 50% of *T. Vogelii*+ *L. camara* 10% and 20 % T. Vogelii while highest larvae/plant was found with mixture of 50% of *T. Vogelii*+ L. camara 20% and 20 % *L. Camara* applied plots. The highest fruit yield was recorded with Emamectine benzoate, mixture of 50% of *T. Vogelii*+ *L. camara* 20% and 10 % T. Vogelii applied plots while the lowest was found with 20 % T. Vogelii applied plots. This study shown that plant extracts are recommended into integrated pest management strategies for control of T. Absoluta.

Keys words: *Lantana camara*, *Tephrosia vogelii*, *Tuta absoluta*, neem, tomato.

MOTSA´A SOB Josephine

Socio-economic and technical characteristics of pig (Sus scrofa domesticus) production system in the humid forest with monomodal rainfall agroecological zone of Cameroon.

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Pig production has become a great source of income and employment in Sub-Saharan countries and Cameroon in particular. However, many pig farmers face difficulties as the production system has not been improved everywhere. Hence, the present study was conducted in other to assess the socio-economic and technical characteristics of pig production system in the humid forest with monomodal rainfall agro-ecological zone of Cameroon. For this purpose, a total of 45 smallholder pig farmers were selected using a snow ball test from the study zone and investigated. A structural questionnaire was used to interview the pig farmers. Data generated included: socio-economic characteristics of the respondents, housing, breeding, feeding, health care, management practices and challenges in pig production. They were analyzed by descriptive statistics. The study revealed that most of the respondents (62.2%) were male and 35.6% were between 40-69 years old. 82% of the pig farmers were married and all (100%) were Christians. Only 4.4% of the farmers had no formal education while 55% had an experience of 10 years in pig farming. Majority of the farmers (44.4%) jointly reared cross (exotic x local), local and exotic pigs. 57.8% of farmers feed their pigs with compounded feed associated with kitchen and farm residues twice daily in feeding through mostly made of plastic materials (37.8%). 84.44% of farmers housed their pigs to avoid destruction and diseases (64.44%). The farmers mostly practiced free will (55.6%) and group mating and delivery takes place in the herd (62.2%). 91.1% of farmers considered pig farming to be profitable. The main challenges faced by farmers were disease outbreak and expensive feed cost (22.2%). Although pig production is profitable, there is no ready market. Nevertheless, pig production has a positive impact in the lives of rural dwellers.

Key words: socio-economic, pig farmers, Production system, Cameroon

DJOMTCHAIGUE BAMARE Herbert

Phenotypic characteristics of camels in 2014 in sahelian area of Chad (Bahr El Gazal)

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This study was conducted between August and December 2014 in sahelian area of Chad (Bahr El Gazal). The main objective of the study was to contribute to a better understanding of dromedary biodiversity in order to preserve and improve its genetic potential. More precisely, to evaluate the morphobiometric biodiversity of dromedaries, to estimate the correlation coefficients between their conformations, to determine the equation of live body weight prediction, to analyze the genetic structure and phenotypic variability of dromedaries. To this effect, a sample of 349 adult dromedaries composed of 93 males and 256 females was selected randomly in five (5) localities of the region. The main results show that: based on visible coat color, it appeared that 85.1% of the sampled animals had tan or fawn coat, whereas cream (4%), black (5.2%) and grey coats (5.7%). The height at withers, the body length, the chest girth and the abdominal circumference were 183.95 ± 0.38 cm, 150.62 ± 0.44 cm, 177.58 ± 1.07 cm and 207.28 ± 1.58 cm respectively. The average live body weight in all localities was 354.24 ± 5.64 kg. Correlations were usually positive and significant ($P < 0.05$) between the conformation and appear very high ($r = 0.97$) between the height at wither and the live body weight. The linear regression equation (LW = 4.546 HW – 476.6) seems to better explain the relation between the height at wither and the live body weight because of its simplicity and determination coefficient ($R^2 = 0.72$). The slenderness index, the relative corporeal index and the compactness index were 0.049 ± 0.005, 0.849 ± 0.010 and 1.950 ± 0.073 respectively. The principal component analysis (PCA) of biometric data reveals that the height at withers and body length contribute for more than 52.07% to the cumulated genetic variability of the population studied. The differential factor analysis (FDA) shows that our population is composed of three genetic types: type A with high characteristics, the height at withers(186.07 cm), abdominal circumference (220.29 cm) and a live body weight (388.10 kg); type B with average characteristics, the height at withers (185.00 cm), abdominal circumference (205.00 cm) and live body weight (361.80 kg) and type C with weak characteristics, the height at withers (180.00 cm); abdominal circumference (200.00 cm) and live body weight (343.44 kg). The phylogenetic tree confirmed the links between these genetic types: types A and B are under one group which is distant to the types C. The biodiversity observed from the dromedaries population will help to conclude that it is possible to perform a selection in order to improve the genetic of this population.

Keywords: biodiversity, dromedary, measurements, regression, sahelian, Chad.

FOKAM MIANTSIA Olivier

Bibliographic synthesis of blue duiker (Cephalophus monticola Thunberg, 1789) consumption in Cameroon

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This study has as objective to contribute to the sustainable management of wildlife through the collection of some information on the blue duiker. This information was collected based on four essential documents elaborating the issue of bush meat. It results from this that mammals constitute the most consumed class of animal with 86% of representability in our urban markets. Duiker's carcasses were the most present in these markets (39.82%). In Bafia, 909kg of carcass of bush meat were weighed, with 39.82% of this carcass being that of duikers among which 23.76 % are of blue duiker's. Duikers are the highest producers of bush meat, but this resource is threatened by poaching. It will be judicious to do their phenotype characterization, which is our new challenge in view of their breeding in game ranching for the sustainable production of game meat.

Key words: blue duikers; bush meat; carcass; poaching.

FOKAM MIANTSIA Olivier

Cultural uses of animals and related conservation practices in the West Region of Cameroon

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The West Region of Cameroon is small in size but rich in bio-cultural diversity. The Region is inhabited mainly by the Bamilekes and the Bamouns who share particular relationships with animals right from the 14th century still present date. From July 2017 to September 2017, and from January 2018 to Mai 2018, a questionnaire survey was addressed to 160 randomly chosen household respondents in eighty-three villages and to 17 traditional rulers in the chieftaincies of Bamougoum, Bamoun and Foto. The three communities have accumulated knowledge on the use of 48 species of which 52.08% represent mammals, 14.58% invertebrates, 12.50% birds, 10.42% reptiles, 8.33% fish and 2.08% amphibians. Animals are either used whole or in parts with 29 animal-parts recorded. Animal uses are categorized into eight main groups, namely (1) trophies (26.19%), (2) animal-based remedy (20.48%), (3) Magico-religious (17.14%), (4) Food, poisoning, clothing and sales values (11.43%), (5) Decoration and jewelry making (11.43%), (6) multipurpose (5.24%), (7) animal parts used as utensils (4.29%), and (8) Ethno musical animals (3.81%), values. The Bamilekes and Bamouns have maintained strong ties with animals at both the material and spiritual level.

Keywords: animal, biodiversity, Cameroon, chieftaincy, conservation, Culture

FOKA TATIEKAM Ebenezer

Potential of a biopesticide formulation based on calcium and azadirachtine on Theobroma cacao seedling production.

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Label cocoa demand increases faster than consumer supply is getting and organic cocoa label represents about 3.5 % of global cocoa production. Cameroon cocoa culture is confronted by numerous constraints among which, parasitic attack (fungi and insects). However, the use of chemical pesticides which is efficient had harmful effects on environment and human health. The use of biocontrol agents like microorganisms, organic matter and plant extracts as well as inorganic elicitors are some promising alternative to synthetic pesticides. The aim of this study was therefore to put forth a biopesticide based on neem (*Azadirachta Indica* A. Juss.), soursop (*Annona on-exis* L.) and calcium while considering their individual properties; its effect on the growth of T. cacao and resistance against fungi (*Phytophtora megakarya*) and insect (*mealybugs* and *Sahlbergella singularis*). Stability of various formulation samples contains neem and soursop extract, calcium and Tween 80 was determined. The most stable was used to evaluate phytotoxic, insecticide and fungicidal effect in vitro. Dilution that did not cause any foliar damage and that possess strong pesticide effect was used to evaluate effect on the growth and resistance of SCA12*SNK16 hybrid. The agro-morphologic parameters of growth were taken for 12 weeks followed by quantitative analysis of defense markers [total polyphenols, flavonoids, tannins, phenylalanine ammonia lyase (PAL) activity Polyphenoloxydases (PPO) and PR-proteins such as β-1,3-glucanase, peroxydases (POX)]. The best formulation has 75% of stability after more than 3 months. Once prepared at 25% (V / V), it retains its insecticidal and inhibitory properties against fungus, promotes the growth of plants significantly ($P < 0.05$) and induces the defence markers mentioned above before and after infection. These results suggest that, our biopesticide formulation is useful by enhancing the quality of cocoa seedling. This can be useful for enhancing the quality of agricultural products for sustainable agriculture and food safety.

Key words: Biopesticide, *T.cacao*, *P.megakarya*, Mirids , defense makers.

FOKAM Paul Ernest

Classification of some phenotypic characters in the Bambara groundnut (Vigna on-existent L. Verdc.) cultivated in Cameroon

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Bambara groundnut (*Vigna on-existent L. Verdc.*) is an edible legume that represents one of the main income sources for women activities. The main goal of this study is to identify the major morphological and agronomic characters responsible for variation among twelve on-exi groundnut genotypes in order to set up selection strategies for improvement. Seeds genotypes of on-exi were on-ex by phenotypic selection based on seed colors. Twenty nine quantitative and qualitative characters selected among the descriptors of on-exi groundnut were evaluated using Principal Component Analysis (PCA). All our genotypes matured earliest (90 WAS) in the experimental conditions. The parameters of flowering and maturity were not permitting to distinguish the genotypes studied in this work. Twenty six characters (for example: petiole length, internodes length, plant height, terminal leaflet length, terminal leaflet width, number of leaves, number of nodes per stem, number of pods and number of seeds) were permitting to discriminate the groups. The genotypes were classified into three distinct groups. The genotypes of II (group NOR6, MBYO3 and MBYO10) presented major characters than those of two others groups. However, the NOR5 and MBYO3 varieties presented the highest number of cloves that was 14 and 13 respectively while the NOR4 variety presented the highest number of nodosities that was 108. This knowledge will help the breeder to select the genotypes which will have the possibility to growth in humid and arid zones. The variability among genotypes is fundamental to the maintenance and further acquisition of germplasm resources even as genotypes from diverse origins are needed as parent stocks for the development of improved varieties.

Key words: Vigna on-existent, agromorphological parameters, genotypes, diversity, nodulation.

MAGNI PACHA Tatiana Flore

Biochemical Assessment of the Protective Effect of a Biopesticide Formulation based on Tropical plant on Cocoa Seedlings in nursery.

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The cultivation of Cocoa, a crop of enormous economic and nutritional importance, is faced with many problems including insects, fungal and parasitic attacks. Chemical methods have been used to remedy this problem. However, they have shown to harmful to producers, consumers, the environment and consequent reduction in the quality of the cocoa produced. Therefore, it is necessity to focus on the production of organic cocoa. As a result, the use of plants such as neem, lemongrass and sunflower as biocontrol agents is a potential control method. The aim of this work was to formulate a biopesticide which has a protective effect on cocoa seedlings in the nursery. The stability of the formulated biopesticide was evaluated by optical microscopy. The insecticidal and fungicidal effects of the biopesticide were evaluated in vitro and in vivo. The agro-morphological parameters were also recorded for three consecutive months, followed by the quantitative analyses of biochemical markers of resistance. Our results showed that the formulated biopesticide was very stable and could be conserved at room temperature. They also showed the insecticidal property of 99.99% and a repellent property of 100% against mirids and mealybugs with a fungicidal effect of 87.5% to *Phytophthora megakarya*. The formulation was shown to be a potential growth stimulant as it favours the increase in agro-morphological parameters such as stem height, number of leaves, leaf surface area, dry and fresh weight of roots. The induced resistance by the bio-pesticide was correlated with increase synthesis of phenolic compounds and total proteins. B-1,3-glucanases and polyphenol oxidases had increased enzymatic activities of 433% and 124.71% respectively as compared to that of the negative control. Moreover, the enzymatic activities of peroxidases and phenylalanine ammonia lyase were shown to increase significantly. The biopesticide based tropical plant can be considered as a biological control agent against plant pests.

Key words: *T. cocoa*, Bio-pesticide, Tropical plant, protective Effect, Mirids, *Phytophtora megakarya*.

DJOMAHA EDWIGE Sidoine

Efficacy of medicinal plat powders against maize weeivil (Sitophilus zemais M. Coleoptera Curculionidae)

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Studies were conducted to find the effect of powdered of seven plant species such as *Echinops giganteus* (leaves), *Cymbopogan citrates* (leaves), *Petroselinum crispum* (leaves), *Ocimum basilicum* (leaves), *Mondia whitei* (roots), *Citrus limon* (pericarp), *Mentha lingofolia* (leaves) along with chemical pesticide Actellic 2% and an untreated control against maize weevil, *Sitophilus zeamais* M. in storage. Experiment was conducted under laboratory conditions (27±2°C and 75% relative humidity) in a complete randomized design with three replications. The different dosages (0, 0.25, 0.5, 0.75, 1 g) were mixed with 20 g of maize grains, infested with 20 adults of S. zeamais. The mortality assessment was at 1,7,14, 21, 28 days after treatment. Results showed highly significant differences with maize weevil mortality rate between treatments, treatment exposure days, treatment dosages and their interactions (P<0. 0001). Actellic 2% caused significantly higher mortality rate (100±0.00%) than the tested plant powders. Mortality rate significantly (P<0.0001) increased with increased treatment dosage and durations of storage. *M. whitei*, alone showed the highest mortality rate (71.67±1.67% at 28 days after treatment with 1 g powder) followed by *M. lingofolia* and *E. Giganteus* respectively (70.00±2.89% ; 66.67±1.67%) at 28 days after treatment with 1 g powder and *M. whitei* (66.67±1.67%) at 28 days after treatment with 0.75 g powder.

Keys words: maize weevil, *Mondia whitei, Echinops giganteus, Mentha lingofolia*, Actellic 2%.

MASSAVA Jean/ MEUTCHIEYE Felix

Genetic diversity of native Guinea fowl populations in Cameroon Northern region

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Between July and September 2017, a study was carried out in the sudano-sahelian zone of Cameroon in order to assess the biodiversity of local guinea fowls for their genetic improvement and preservation. A total of 278 adult guinea fowls were sampled in six localities to record morpho-biometric characteristics. The principal results showed that: the pearl grey color of plumage was dominant (31.7%), barbel was folded up under the nozzle in the males (100%) and was directed towards the back of the nozzle in the females (100%).The tarsus in majority was black (54.6%). Several morphobiometric characteristics varied ($p < 0.05$) with locality and sex. Mean body measurements (cm) were obtained as follows: beak length (2.04 ± 0.31), nozzle length (1.91 ± 0.07), caruncle length (0.95 ± 0.09), barbel length (3.57 ± 0.48), tarsus length (6.14 ± 0.42), barbel height (2.44 ± 0.42), tarsus diameter (1.08 ± 0.06), rammer length (8.97 ± 0.82), wing length (22.83 ± 0.76), body length (37.93 ± 1.06), wing span (45.65 ± 1.52), thoracic circumference (31.62± 1.40); average body weight in kg (2.11 ± 0.26) was higher in the females (2.22 ± 0.22) than in the males (1.86 ± 0.16).This weight was higher in the locality of Garoua 3 (2.17 ± 0.26) and lower in the locality of Touroua (2.03 ± 0.21). The correlations varied and weak (-0.01 to 0.45).The highest positive significant correlation ($p < 0.05$) was observed between wing length and wing span ($r = 0.95$). Barymetric equations had very low coefficients of determination and varied from 0.06 to 0.08. Analysis of principal components (APC) showed that nozzle length, caruncle length and beak length explain total genetic variability better (42.99 %). Discriminating factorial analysis (DFA) and phylogenetic analysis revealed the existence of 3 genetic types gathered in 2 sub-groups. Biodiversity observations suggest that the local guinea fowl constitutes a potential genetic resource for genetic improvement and conservation measures will be useful for this natural resource for meat and egg supply.

Key words: Biodiversity, guinea fowl, measurement, correlation, North Cameroon

MASSAVA Jean/ MEUTCHIEYE Felix

Factors constraining the Socioeconomic importance of native Guinea fowl in Cameroon Northern region

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Despite the fact that guinea fowl is considered as a nonconventional livestock species and its husbandry is mainly concentrated in the Cameroon northern zone, it constitutes a potential source of income and proteins. The objective of this paper was to describe the socioeconomic features of this poultry species in Cameroon sudano-sahelian region. The survey was undertaken between July and September 2017. A questionnaire was administered to 72 guinea fowl keepers chosen randomly in North Cameroon region. The main findings showed that the guinea fowl husbandry was dominated (77.8%) by men. The average size of the livestock ranged between 5-10 adult animals and the principal objective was own consumption and sales (69.44%).The breeding stock originated in general from natural incubation of eggs by hens (88.88%) bought in majority on the local markets (84.5%), or individual wild collected eggs and the immediately brooded by domestic hens. The guinea fowls were under uncontrolled mating system in complete scavenging (66.66%). Feed supplementation was mainly made up of corn and millet, and the seasonal watering was observed during dry season. Majority of mortalities (80.55%) of keets were between 8 and 12 days. The majority of the stock breeders (76%) did not practice disease prevention. The technico-financial constraints were the main barrier to the development of this husbandry. The organization of the producers, suitable techniques and the support by government livestock officers and private sectors would help to improve the performances of reproduction and thus of the exploitation of this animal genetic resource.

Key words: Poultry, Guinea fowl, Income, North Cameroon.

MEUTCHIEYE Felix

Preliminary results of artificial reproduction of African Honey bee colony (Apis mellifera adansonii) in Cameroon

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The African honey bee is known to reproduce colonies by natural absconding during a certain period of the year, when conditions are on-existe. Honey bees live in a community depending mainly on the queen which gives direction and holds the whole survival of the colony. Artificial methods have been tested for century on European honey bee with a relative success rate. There was no report of artificial division of colony under controlled conditions in Cameroon where honey and other beehive's products are highly valued in comparison to the growing demand. Based on empirical observations, the hive monitor at GIC LUMICAM observed some trends in African honey bee in Cameroon Centre region. The aim of the current study was evaluating performance of two alternative methods to produce royal cells in honey bee colony. The preliminary results based on observation in 5 months showed that there was a total of 490 viable royal cells developed after induction. The method applied induced a rate of 34.49% royal cells production. Out the royal cells produced, 88.75% developed into viable colonies. These preliminary results are very promising for apiculture sector as well as pollination industries in Cameroon. Artificial absconding under controlled conditions by colony divisions is therefore to be well elaborated and curricula developed for training and extension to end-users. This will improve the performances of beekeeping sector in whole central Africa, where honey production potential is very high.

Key words: Reproduction, Honey bee, Colony, Royal cell division, Cameroon.

MWANDWE BEYA ARLETTE

Morpho-biometric features of local hen (Gallus gallus) in Kambove territory – Democratic Republic of Congo

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The poultry sector undoubtedly offers, by its relatively short production cycle a quick and accessible solution for the greatest number of the population. As such, from February to May 2017, a study was carried out in the territory of Kambove with the general objective of contributing to a better knowledge of the biodiversity of local chicken. A sample of 197 adult chickens was surveyed. Each animal was described by direct observation, weighing and body measurements according to a pre-established experimental protocol based on AU IBAR standards. The mains results showed that most of the variables were significantly influenced by locality and or sex. Different phenotypes have been identified; the normal distribution of plumage is widely represented (84.8%). The color of the plumage is very varied, with black color dominant (21.8%). The average measurements were: live weight 1184.2 ± 46.0g; the length of the body 37.2 ± 0.3 cm, the total leg length 24.9 ± 0.3cm ; thoracic perimeter 24.1 ± 0.2cm. The highest positive correlation was observed between wingspan and wing length ($r = 0.96$, $p \leq 0.05$). Principal Components Analysis showed that the first two components contribute to 52.0% of the total genetic variability. These components mainly concern barbel length (10.2%) and body length (18.1%), total leg length (18.9%) respectively. The hierarchical ascending classification and the discriminant factorial analysis have shown that there are 3 genetic types that can be grouped into 2 subgroups. This biodiversity suggests that the local chicken is a natural genetic resource with likely genetic variability to undertake genetic improvement.

Key words: Poultry, Genetic diversity, Phenotype, Metrics, DRC.

NKWENDEM DJOUATSA Gorothy

Genetic diversity of edible snails in Cameroon Coastal region

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The genetic diversity of edible snails in the Coastal region of Cameroon was studied between March and June 2018, using a sample of 564 snails collected from three sites (Loum, Niombe and Mbanga). The results revealed that the dominant shell colouration was black with whitish markings (55.39%) while others were brownish with whitish markings (44.6%). The black foot colouration was dominant (31.02%). The diagonal length (DAL) was 27.16±4.32mm for *A.fulica* and 27.47±3.87mm for *A. marginata*. The length of the right side (LRS) gave 39.09±7.08mm for *A. fulica* and 32.78±5.96mm for A. marginata, the length of the left side (LLS) was 28.56±5.34mm ft for A.fulica and 23.18±3.6mm for *A. marginale.* The average number of turns (NT) was 7.29 for *A.fulica* and 5.74 for A. marginale. The width of the aperture (APW) was 18.62±3.18mm for *A.fulica* and 21.06±3.04mm for A. marginata, the length of the aperture (APL) was 35.59±5.2mm for A. fulica and 41.26±4.7mm for *A. marginata*. The average shell length (SHL) of snails was 71.09±12mm for *A.fulica* and 70.15±8.84mm for the *A. marginata.* The average length from the apex to the first turn (LFA) was 32.18±6.13mm for *A. fulica* and 26.73±3.97mm for A. marginata. The shell width (SHW) was 37.27±5.57mm for *A. fulica* and 39.83±4.7mm for *A.marginata.* The live weight (BDW) was 33.59±15.09g and 37.67±12.59g for A. fulica and *A. marginata* respectively. Thus the results obtained could serve as a tool for unconventional sector improvement in Cameroon and other African Countries.

Keywords : Genetic, diversity, edible, snails, Cameroon

NGONO EMA Patrick Jolly

Phenotypic characterization of two Bos indicus populations in northern Cameroon using biometric tools

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Two adult cattle populations in North Cameroon, one of the Red nalys breed (102 of which 81 females and 21 males) and the other of the White nalys breed (88 including 70 females and 18 males) were characterized by biometric tools involving 12 simple measurements (the height at the withers, the length of the tail, the length of the face, the width of the face, the nalys of the ears, the length of the horns, the occipito- ischial length, the nalyse-ischial length, the bump circumference, the perimeter of the canon bone, the thoracic perimeter and the weight) and five combined measures (Body nalys Index (IBL) = nalyse-ischial length / height at withers; the Hearth Girth index (IHG) = chest circumference / height at the withers, the index of the barrel bone = circumference of the barrel / thoracic circumference, the index of compactness or massiveness (MI) = live weight / height at the withers, and the thoracic auricular index (IAT) = length of the ear / depth of the thorax). In general, White nalys were distinguished from Red nalys by all the measurements taken, except for the length of the ear and the length of the face. The height at the withers varied, for example, from 126.56 ± 4.87 cm in Red nalys to 131.90 ± 4.91 in White nalys. In contrast, with the exception of the compactness index, which was higher in White nalys (2.72 ± 0.22) than in Red nalys (2.49 ± 0.38), all other indices were comparable between these two cattle breeds. Within each of these breeds, sexual dimorphism was more pronounced in White nalys than in Red nalys cattle breed. This dimorphism was confirmed by a significant Mahalanobis distance (11.86 ± 6.92 with $p < 0.005$) in white nalys according to the gender.

OUABA TANEFO Cyndi José

The economic importance of Lepidoptera in Cameroon: a literature review

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Lepidoptera are one of the most abundant and diverse insect groups in the world. This order comprises 178,159species. This paper discusses the economic importance of these insects in Cameroon. The work was built on the wide consultation of 72 published papers ranging from 1950 to 2018 It appears that in Cameroon, there is a great diversity of insects belonging to Order Lepidoptera. Their economic importance was somehow conflicting, with a mix of good and bad. Indeed, some of these are threats to agricultural production, because they are pests at various stages, army fall worm being the worst one. Their impact on food security has been already monitored and led to the conclusion that with climate change, lepidoptera are the most important group of agricultural pests to study for sustainable production. Meanwhile, besides the use of butterflies' wings for craft and artworks (which is narrowed in urban touristic environment), Lepidoptera are also a group or marketable food source in Cameroon humid regions. Larval stages are sold fresh, dried or parboiled in rural and urban markets. This review concludes that there is need in a context of food security to evaluate deeply the diversity of Lepidoptera, their specific economic importance, their geographical distribution and seasonality, and by presenting the need to promote a better valuation of those having positive economic importance and a better control of those with negative importance. There is lack of factual knowledge which needs to be elaborated more in subsequent research.

Key words: Natural resources, Insects, Food, Pest, Cameroon

NGOU DJOU Jacquette-Hortance

Peasant farming on the slopes of the Bamboutos Mountains (West Cameroon) in the face of climate variability: for what food security

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The natural potentials of the Bambouto highlands allow them to be a particularly coveted area for market gardening. These agricultural activities are practiced on slopes of up to more than 20°. However, agricultural activity is currently experiencing difficulties related to climatic instabilities. This article aims to show that the agricultural production of the Bambouto Mountains, despite these climatic hazards, contributes to food security on several levels. Analysis of variations on certain components of the physical environment, observations and field surveys of farmers coupled with information obtained from agricultural outpost offices made it possible to nalyse the contribution of peasant agriculture in the Bambouto Mountains to food security in a context of climatic disturbances. The results obtained show that the climate of the Bambouto Mountains is experiencing some perturbations which impacts on peasant farming practices. The quantities produced make it possible to supply the local markets, the big cities of Cameroon and even the countries of the Central African sub-region (Gabon, Central African Republic, Congo, Equatorial Guinea ...).

Keywords: Peasant farming, climatic perturbations, food security, Bambouto mountains.

NZALI Serge

Effects of Plasma Activated Water on Postharvest Storage Quality of Green Bell Pepper (Capsicum frutescens L. var. Longrum)

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Plasma activated water (PAW) resulting from short time exposition of water to non-thermal plasma has assume to be an alternative method for microbial disinfection and promoting seed germination and plant growth. In this study the effects of PAW on postharvest storage quality of Green Bell peppers were studied. PAW was obtained by exposing 450 mL of distilled water to a gliding arc plasma generated using reactor and moist air as feeding gas (flow: 800 L.min-1). Distilled water (450 mL) was disposed normally to the axis of the water cooled glass reactor at a distance of about 50 mm from the electrodes tips and exposed to the plasma for 30 min. After the discharge was switched off, PAW was ready and transferred to a sprayer for use. 10 samples of Green bell peppers were treated once with PAW and the changes in postharvest preservation quality of the peppers were evaluated during the storage at room temperature for 20 days. As compared to the control (untreated samples), the inhibition of rot of the peppers was observed for all the treated fruits. The rot rates of the untreated samples were 50% and 100% respectively after 2 and 5 days of storage, while the treated peppers remained edible after 20 days, showing a gradual color change from green to red. The results suggested that PAW treatment effectively delayed the postharvest spoilage of green peppers by inhibiting the microflora (molds, yeasts and bacterias) propagation on top of the treated samples. PAW has different chemical composition which results in changes of the redox potential, conductivity, acidification, and in the formation of reactive oxygen (H2O2) and nitrogen species (HONO2, NOx etc). These preliminary observations offer interesting prospects with regards to the preservation of highly perishable and/or exported fruits and vegetables from Cameroon.

Key words: green bell pepper (*Cupsicumfrutescens* L. var. Longrum), plasma activated water, post-harvest, storage quality

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In developing countries like Cameroon where food technology is still embryonic, food production and conservation are faced with major problems. Due to her tropical zone location, Cameroon harbours favourable conditions for moisture proliferation, giving room to aflatoxin production in food and food crops. The fungi that produce this toxin, *Aspergillus spp.*, can develop under favourable moisture and temperature conditions (28°C) on a variety of foods especially those made from cereals and groundnuts. Nowadays, this situation is obvious on all agricultural products.

Studies have shown evident correlations between the ingestion of these toxins, food toxicity and in the long run primitive liver cancer. A recent study conducted by the "Centre Pasteur" of Cameroon (CPC) financed by FAO with the technical support of WHO evaluated the level of exposure of Cameroonian populations to toxic contaminants present in food (Ingenbleek et al., 2017). The aim of this study was to evaluate the risks encountered by the Cameroonian population with regards to their feeding patterns and identify some national priorities that could enable the Cameroonian government to take measures in order to ensure better health conditions for the population. This study revealed three main groups of chemicals affecting the foods consumed by Cameroonians, notably mycotoxins, pesticides and aromatic polycyclic hydrocarbons (CPC Report, 2018).

In the first group of contaminants, 295 mycotoxins were tested for. Of these, 164 were detected and 98 metabolites were present in one sample. A seasonal contamination pattern of foods by aflatoxins was observed. High variation of the concentration of these metabolites in samples grouped by pool and regulated mycotoxins were considered a national priority (CPC Report, 2018). Within 5000 foods analysed, smoked fish, groundnuts and groundnut oil were the most contaminated with aflatoxin in Cameroon. High levels of aflatoxin B1 (65.5 µg/kg of groundnut) were detected in groundnuts as compared to the international ISO 16050 or 17355 norms (2.5 to 8 µg/kg) and these levels varied with respect to the agro ecological zone of cultivation in Cameroon (CPC Report, 2018).

Factors highlighted as responsible for these contaminations include bad production practices performed by actors of the food supply chain. Mycotoxins are present all along the chain, from the farm to the consumer. The length of time and conditions of drying and storage are the determinant factors of fungi development.

The principal impact of aflatoxin on crops is the loss of their commercial value in the international market and even rejection on exports given the recently signed economic partnership contracts with the European Union which have been in place since August 4th 2016.

This presentation aims at sensitizing producers, consumers and public stakeholders on the dangers of aflatoxin, a silent killer which is gradually destroying Cameroonians population; and to lay emphasis on the agricultural practices that can help ensure better health conditions for the population.

Keywords. Mould, *Aspergillus* sp., Aflatoxin, foods, liver cancer, agricultural practices, drying, storage.

NTSOMBOH NTSEFONG Godswill

Lipid analysis and genetic variability study of oil palm (Elaeis guineensis Jacq.) highlight findings to address controversies around development and consumption of palm oil

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The oil palm (*Elaeis guineensis* Jacq.) which originated from Africa is mainly distributed in tropical regions of the world. It is a unique crop that produces two kinds of oil from the same fruit with significant economic values, namely crude palm oil (CPO) and palm kernel oil (PKO). Improved varieties from 2nd cycle selection currently produced by IRAD Cameroon have a CPO yield potential of 4.5t oil/ha/year with best genotypes capable of producing 10 tons CPO/ha/year in optimal cropping conditions. The development of oil palm industries in many tropical countries has been motivated by this extremely high potential productivity. Palm oil contributes about 32% total oil crops production in the world i.e. about 1/3 world's vegetable oils. However, world demand for fats and oils is continuously increasing, hence the need to extend the areas planted to oil crops and the need to improve on oil yields and dietary quality. This industry faces major problems such as yield losses due to diseases (Fusarium wilt, Ganoderma, Bud rot), controversies on environmental consequences of its production, and concerns on the health effects of palm oil consumption.

In order to contribute towards mitigation of these concerns especially with regards to the controversy on the negative health effects of palm oil consumption, we realized a study on fatty acids analysis and triacylglycerol (TAG) molecular species characterization. The work was based on the fact that palm oil might be involved in the incidence of cardiovascular diseases (CVD) due to its high content of saturated fatty acids. We aimed at identifying and genetically developing new genotypes that naturally produce oil with low saturated fatty acid content in order to improve the dietary quality of palm oil. Results showed a wider than expected genetic variability among the trees screened, with some elite palms producing lower than expected saturated fatty acids. We found oil palm trees yielding crude palm oil with as little as 24% palmitic acid, not far from 16-19% values in *E. oleifera*. This suggests that it should be much faster to directly develop new oil palm genotypes needed to produce commercial seeds with elite *E. guineensis* planting material, than introgressing the low saturated fatty acid content trait from *E. oleifera,* which is the strategy commonly used. Moreover, our analysis of TAG molecular species in palm oil within the same project have improved understanding on the possible influence of individual fatty acids on the incidence of CVD and other metabolic disorders.

WIKONDI J

Economic importance of small ruminants in the Far-North Region (Cameroon)

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The socioeconomic of small ruminant breeding were studied from April to September 2010 in the Mayo-Danay Division (Far-North Region Cameroon) using questionnaires to 100 breeders randomly selected.

Analysis have shown that raising small ruminants, although the majority of them are male (66.0%). The age of the breeders varies from 21 to 60 years for the majority, about 55.0% of them being educated, only 10.0% having a training in breeding. The main reason for farming is self-consumption and sale, and so small ruminants play a role in generating income for smallholder farmers in this part of the country with an annual contribution in household income estimated at 50,000 to over 200,000 FCFA.Overall, small ruminant livestock is not considered as the main activity and the labour is famillial (99.0%).

The herd size varied from 1 up to 50 with an average of 13 animals per breeder. Mixed sheep and goats are dominant (46.0%) and the majority of breeders (89.0%) have constituted the founding herds through the purchase of animals locally. Follow-up consists of housing (76%), food supplementation (94%), and veterinary care (60%). The mean age at first mating is 9 and 7 months respectively in ewes and goats, while males are reproduced around 8 months. This precocity is an advantage over the average life span of small ruminants at 8.2 years (ewes), 7.8 years (goat), 4.1 years (rams) and 3.3 years (goats). The control of health risks and a better training of breeders in the process of value chains and their organization would improve the economic functions of this farm.

Keywords: Rural economy, animal production, sheep, goats, Far North, Cameroon.

BASSANG'NA ENOGA Ghislain

Evaluation of the consideration of the pillars of Sustainable Development in the project of rehabilitation of the National Road No.1, Maroua-Mora section

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The general objective of the study in the Far-North Region was to assess the environmental and social aspects of achieving the objectives of sustainable development in the National Highway No. 1 rehabilitation project. Maroua- Mora section. This work was conducted from November 2017 to March 2018. The methodology consisted of a major literature review, field surveys and direct observations. This method made it possible to frame the aspects of Sustainable Development in the study area, to evaluate the conformity of the Environmental and Social Management Plan (ESMP) with the Sustainable Development Goals (SDGs) and to highlight measures aimed at to improve the integration of the Sustainable Development approach in the context of this project.

Results obtained, the framing of the pillars of Sustainable Development in the social component showed that in the study area, the FOSA (health facilities) are represented in majority by the CSI (integrated health centers) (89.39%) under-equipped and under-structured, primary education institutions (80.05%) under-equipped, in the field of education, while 97% of the population draws water from wells (managed or unmanaged) and drilling. The economic component revealed the presence of very unstructured and localized markets for the whole of the immediate edge of the roadway. The most redundant impact measurements are progressively implemented over the first 10 km of the section under study. The analysis of the ESMP showed that the indicators identified (4) by the project and for the different impacts selected, were not very consistent (2) with those defined by the World Bank in the context of road projects. The comparison between the grievances of the populations, the associated related measures and the provisions for the achievement of the SDGs in the study area shows a lack of consideration of environmental, social and economic measures, particularly with regard to SDGs no. 3 (good health and well-being), 5 (gender equality), and 7 (use of renewable energy). Consideration of new measures and indicators integrating both SDG concepts and donor requirements will need to be implemented for any future program or project related to sustainable development.

Keywords: ESMP, SDGs, Indicators, Sustainable Development, Social, Road Project.

ATABONG Paul Agendia

Environmental and socio-sanitary impacts of untreated slaughterhouse wastewater from markets in a tropical urban area: Case of Yaounde-Cameroon.

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Due to the high nutritional value of meat, meat consumption has increased in the world. Meat production is considered to have the greatest environmental impact. However, in the context of Cameroon only few impact studies have been done on the effluents produced from this activity. This study aimed at assessing the impact of the Mvog-ada and Essos market informal slaughterhouse wastewaters on the socio-sanitary and environment. The methodology included; documentary research, field work and physicochemical and bacteriological analysis of samples collected. Surveys revealed; 39 pigs, 400 poultry and 21 goats are slaughtered daily in both informal slaughterhouses. 50 % use both tap water and well water for cleaning slaughtered animals. 37.5 % use 15-25 L of this water for the process and an approximately 20 m^3 of wastewater is generated each month and disposed into the watercourse. After triplicate sample analysis for physicochemical and bacteriological parameters we obtained; pH (8.08 ± 1.44), Temperature (27.67 ± 1.01 °C), Conductivity (4663.33 ± 1678.16 µS/cm), Salinity (2.68 ± 1.18 ‰), TSS (9666.67 ± 10254.83 mg/L), TDS (2600.33 ± 1108.16 mg/L), NO_3^- (122.37 ± 67.77 mg/L), PO_4^{3-} (252.6 ± 175.10 mg/L), COD (1493.33 ± 1673.46 mg/L), BOD_5;(1016.67 ± 1115.89 mg/L), faecal coliforms ($1.91 \times 10^6 \pm 2.2 \times 10^6$ CFU/100 mL), and faecal streptococci ($6.12 \times 10^5 \pm 4.15 \times 10^5$ CFU/100 mL) generally above WHO/MINEPDED (Cameroonian) guideline. 47.95 % of

household respondents face daily nuisances such as insects (26.11 %), small rodents (22.12 %), Odor (19.03 %), flood (17.7 %) and noise (15.04 %). 69.86 % of respondents suffered from malaria and waterborne diseases. The need of wastewater treatment technologies adapted for slaughterhouse effluent is crucial in order to reduce potential impacts caused by their discharge into nature.

Keywords: Wastewater management, informal slaughterhouse, sanitary risks, natural environment, tropical urban area, Cameroon.

TCHIANZEU TEKAMDJO Lauris Stéphane

Evaluation of the purification performance of a fecal sludge treatment plant in a tropical urban environment: case of the city of Bafoussam

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The present research work is a contribution to the study of a natural system of purification of waste stabilization pond for sludge treatment in the city of Bafoussam. Trials were conducted from July 2017 to February 2018 to evaluate treatment performances and algal diversity in waste stabilization ponds. The methodology consisted of sampling raw faecal sludge and wastewater from different waste stabilization ponds. These samples were then taken to the laboratory in refrigerated boxes for physicochemical and bacteriological as well as for determination of algal diversity according to standard protocols. The values of the physicochemical parameters recorded at the exits of the treatment plant and their respective removal efficiency are of the order of 25.63 mg/ L (99.71%) for the MES, 791 µS/ cm (59.84 %) for CND, 2.93 mg / L (99.33%) for NO_3^-, 5.46 mg/L (95.47%) for NH_4^+, 3.31 mg/L (88.44%) for PO_4^{3-}. The elimination of organic pollution averaged 227 mg/ L (97.85%) for the COD and 70 mg/ L (95.4%) for the DBO_5. Bacteria concentration and removal averaged 130 CFU/100 mL (99.99%) for faecal coliforms and 64 CFU/100 mL (99.99%) for faecal streptococci. The microscopic observations made it possible to identify in the samples 43 species of algae divided into six classes, 19 families and 26 genera. In general, the system allows for better elimination of physicochemical and bacteriological pollution, since the concentrations obtained in the discharge waters are compatible with the national (MINEP DED, 2008) and international (WHO) discharge standards. Except for BOD_5, COD and TSS.

Keywords. Fecal sludge, treatment plant, natural waste stabilization pond, performances, algal diversity, tropical urban area.

NGOUKWA Guylene

***Impact of slaughterhouse wastewater on the quality of surface water: case of SODEPA, Yaounde-Cameroon*.**

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The preservation of biodiversity, the sustainable management of ecosystems and the population growth associated with urbanization are today vital and urgent issues. In order to evaluate and identify the effects of the pollution of the Etoudi slaughterhouse on the quality of Ako'o watercourse, four gradient were sampled namely : upstream of the Ako'o watercourse, at the exit of raw effluent from the slaughterhouse, the contact of the raw effluent with the watercourse and downstream of the course in order to better estimate the progress of the pollutant. Thus, the physicochemical parameters avour water were on-exis in the four gradients during these survey.

The results show that the average pH is neutral overall (7.2 ± 0.2). The average temperature 26.45 ± 1.6 °C is lower than the MINEPDED standard norms for discharge. The highest values of conductivity (1258.7 ± 709.7 µS/cm), phosphates (265.5 ± 281.8 mg/L), COD (1419 ± 547 mg/L) and BOD5 (384 ± 77.6 mg/L) are at the outlet avour slaughterhouse's raw effluent. The nitrate level (1626.3 ± 734 mg/L) is also higher at this level. Significant differences are recorded between the parameters avour raw effluent leaving the slaughterhouse and the three other levels. The summary table avour physiochemical parameters avour

different sampling levels makes it possible to highlight the impact of slaughterhouse effluents on the aquatic ecosystem and thus the need to set up a functional and appropriate treatment system within the slaughterhouse.

Keywords: Slaughterhouse, wastewater, impact, aquatic ecosystem, treatment system

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Sustainability of water and sanitation services in Mandjou's Council, East Cameroon.

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Water management and sanitation services in rural areas of Cameroon are still alarming. Water points that are regularly broken down are abandoned over a short period of time after construction. The present study was conducted at the Mandjou council, Eastern region of Cameroon, with the purpose of examining the sustainability of water and sanitation services. Therefore, data were collected using direct observations, a grid of observation and interviews. The sustainability of sanitation and water services was assessed using scoring method. Results indicated that 86 water points (32 boreholes, 50 wells and 04 springs) were constructed in the council for community water supply. Among them, only 59.3% are functional. The equivalent water point estimated was of 37% while the cover rate of the water needs was 22%. The sanitation infrastructures were essentially ranged in the frame of autonomous system made of pit latrines. The inventory of latrines in public services (schools, health center, and markets) showed that the cover rate was only 68.75%. Overall, water services were found not sustainable (score <50). Only Bazzama's services satisfies the basic criterion of sustainability (score of 58.5>50). This was similar for the sanitation services generally not sustainable (score of 40 <50), except for the sanitation service of the health center (score of 79.25 >50).

Key words: Drinking water, sanitation, water point, service, sustainability

FOTSEU KOUAM Arnold

Quality of water used for the irrigation of wetland crops in the humid zone of Yaounde (Cameroon)

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Wetlands are now a pole of production of market gardening crops and various products to meet the perishable food needs in large cities. Irrigation of these crops is mainly provided by local water resources including wastewater of all kinds, which are ultimately emptied in wetlands. Although this water has the advantage in that it is rich in phosphate and nitrate for plants, it remains a potential source of parasite contamination. In Cameroon, helminthiases are among the most chronic parasitic diseases. It was in the light to study the parasitological quality of the water used for crop irrigation that a study was conducted from January to June 2016 in a few marshy areas in Yaounde. Monthly water sampling was carried out on eight wetlands. Observations of helminth eggs were made under an inverted microscope. The physicochemical on-exis reveal poorly oxygenated waters, moderately mineralized (566.16µS/cm), poor in Suspension solids (31.21mg/L), in nitrates (5.48mg/L), in ammoniacal nitrogen (0.32mg/L) and orthophosphates (5.77±2.40mg/L). The biological analysis reveals the presence of eggs (514parasitic agents/L) belonging to the Genera Ascaris, Enterobius, Ankylostomes, Strongyloides, Trychostrongylus, Trichuris, Taenia, Hymenolepis, Diphyllobothrium, Fasciola. In the short rainy season 361±274 eggs/L were counted against 153±119eggs/L in the long dry season. The results obtained showed that the swampy areas studied were subjected to faecal pollution which greatly degrades the quality of the water. To limit the risks of contamination of crops and humans, it is necessary to create mechanisms that can reduce the parasitological load of water before their release in to nature.

Key words: Crops, Resistance, Helminths, Swamp, Pollution

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Evaluation of wood density of red and white mangrove species at different degradation state of Cameroon coastal area

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This study had as focus to contribute to the sustainable management of Cameroon coastal area through the amelioration of knowledges on wood density, of red and white mangrove species at different state of degradation. A stratified harsadous sample was realized. A notice shows that wood density of red and what mangrove in Rio Del Rey are respectively of 0.46g/cm3 and 0.40g/cm3 (averagely degrading state). In Cameroon estuary, the wood density of white and red mangrove for averagely and poorly degrading state is respectively of 0.31 and 0.28g/cm3 and that of the red mangrove is 0.37g/cm3 (poorly degrading state). Otherwise in the Rio Ntem, the white mangrove is like on-existent, the wood density of red mangrove is of 0.50g/cm3(natural condition). Meanwhile, the values of wood density in each bloc are: (Rio Del Rey (0.43g/cm3)); (Cameroon estuary (0.32g/cm3)); (Rio Ntem (0.50g/cm3)). However, wood density of red and white mangroves of Cameroon is estimated to 0.43g/cm3. Is then important to develop inclusive protection strategies for mangroves such as green coal in Nypa fructicans, improved smokers, stilt constructions, above ground agriculture.

Key words: Evaluation, Wood density, Red mangrove, White mangrove, Degrading, Coastal area

TCHE Jacob

Firewood Cooking, STS and Environmental Degradation In Cameroon

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Externalities caused by cooking with firewood in Cameroon is significant. There is a consensus among academics and policy makers that the latter externalities are related to the degradation of the environment. For example, the Global Alliance estimated in 2015 that firewood cooking costs 0.5% of annual global GDP. According to the World Health Organization (2019), firewood cooking is one of the highest pollutant causing close to 4.2 million global premature deaths. The UNdata (2019) estimated in 2017 that 19,000 Cubic Meters of firewood was consumed in Cameroon. On the other hand, according to the World Bank (2019), 23% of Cameroonians had accessed to cooking clean fuel methods. Science and Technology (STS) have enabled the development of clean cooking fuel such as biogas, LPG and improved stoves which contribute to the reduction of $C0_2$ emissions in Cameroon. The general aim of the present paper is to provide a unique opportunity to carry out an Econometrics investigation of the cointegration and causality relationships between STS and environmental degradation in the context of the Bingjie *et al* (2019) model which is estimated and tested for the case of Cameroon using annual data for the 2001-2014 period. Our statistical analysis followed by our Multiple Regression, Multicollinearity, Heteroskedasticity, Autocorrelation, Unit Root, Cointegration, Error Correction and Causality tests have been carried out successfully. The tests indicate that STS significantly reduce environmental degradation. This study offers a unique opportunity in Cameroon to undertake the above Econometrics analyses. Lessons from this study will feed into a larger discussion on the role and importance of STS to develop cleaner cooking systems such as LPG and Biogas. STS contribution is therefore crucial to realize UN Sustainable Development Goal of climate change. Users of biogas, LPG and improved stoves will be present in the conference.

Keywords: Firewood, Environmental Degradation, Clean Fuel and $C0_2$ emissions

Jacob TCHE

The Environmental Kuznets Curve and Science-Technology-Society in Cameroon

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The Environmental Kuznets Curve (EKC) is named after Kuznets (1955) who proposed that there is an inverted U-shape relationship between environmental degradation and income per capita. In other words, in the early stage of economic development or industrialization phases, environmental deterioration increases first, and tends to decline when the country reaches higher level of the Gross Domestic Product (GDP) per capita. The EKC concept became prominent in the 1990s with works such as that of Selden and Song (1992), Panayotou, (1993), World Development Report (1992) implying a significant relationship between GDP per capita and environmental degradation. Moreover, the common denominator in the above works is the assertion that, at the early stage of growth, environmental degradation increases faster than income and slows down relative to GDP growth at higher income levels. To our knowledge no paper has assessed the role and importance of STS in the EKC for the case of Cameroon. The inclusion and test of STS in the EKC for the case of Cameroon therefore breaks new ground. Based on the EKC modified and tested by Wen-Cheng-Lu (2017), statistical analysis followed by Multiple Regression, Multicollinearity, Heteroskedasticity, Autocorrelation, Unit Root, Cointegration, Error Correction and Causality tests have been carried out and indicated no significant relationship between economic growth and environmental degradation but indicated that STS significantly reduce environmental degradation. We therefore suggest in this paper that STS has a positive and significant role in environmental degradation in Cameroon.

Keywords: Environmental Kuznets Curve, Income per Capita, and carbon dioxide emissions

Jacob TCHE

Urbanization and environmental degradation: The role of Science-Technology-Society

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Urbanization is the growth of urban area in a specific country followed with the population growth living in those areas. Urban populations interrelate with the environment through their depletion of food, energy, water, and land causing a rapid polluted urban environment which will then generate many problems such as excessive air pollution, high demand of housing, poor water quality, climate change, loud noise, waste management and poor health. In response to unregulated urbanization, environmental degradation has been occurring very rapidly. For example, the human Development Indices (2018) reported that high human development countries are the biggest contributors to environmental degradation with 10.7 tons average carbon dioxide emissions per capita. Small countries, on the other hand, with 0.3 tons of carbon dioxide emissions per capita have been found to pollute less. According to the World Bank (2019), the population of Cameroon grew at the rate of 3% from 2005 to 2015 while during the same period carbon dioxide emissions per capita has increased at the rate of 4%. The current low trends of carbon dioxide may be justified by factors due to global change such as science and technology (STS). Based on Komivi (2016) model, the broad aim of the present study is to evaluate empirically the impacts of urbanization together with some other explanatory variables on environmental degradation in Cameroon for the 2005-2015 period. This study breaks new ground in a number of ways. Firstly, we undertake an econometrics analysis which aims at filling the lacuna created by the lack of econometric work on Cameroon's environmental degradation and urbanization. Secondly, it contributes to the existing literature by showing a positive outcome for environmental degradation and STS in Cameroon. This study supports that to encourage an environmental friendly urbanization, more TST products should be developed.

Keywords: Urbanization, Environmental Degradation and carbon dioxide emissions

NYETAM Benjamin

New regard on Scientific and Technical Research challenges in Cameroon: draft of solutions.

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Most of African countries and Cameroon in particular, meet development problems that touch various scientific and technical domains and consequently, many sectors of economy and life. The statistics are loud.

The scientific and technical research which could have among other missions to find solutions and create innovative products for the development of countries, is actually touched by various diseases: lack of project funding, lack of vocation or motivation of researcher, need of a researchers and support staff statute, incompleteness in universities' programs and training, abandon of some key sectors, the problem of retirement age, a poor valorization of research, exclusion of some actors from the research chain, inefficiency of research infrastructures and equipment, the problems of governance, patriotism, intellectual property, the enslavement of national research to external one, lack of training by the state in specialized schools like ENAM, lack of start-up or enterprises, lack of guide book facilitating start-up creation, the small budget granted to the Ministry of scientific research, the exclusion of some stakeholders from the research process, politics that first avour majority that quickly recuperate good ideas instead of the minority or individuals that are the creators of those ideas which are not finished yet. The lack of exploitation of research results involving enterprises or start-up.

Several ways of solutions can be consider at the level of the government, as well as universities, research structures, stakeholders, others professions or domains in human sciences like history, geography, sociology, entrepreneurship, marketing, journalism, and of course the interconnectivity among applied sciences and technologies.

FOMINI TEDONKENG Jean

Anthropometric and physical characteristics of some elite 1 Cameroonians soccer players.

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The performance in soccer team depends largely on the anthropometric and the physical characteristics of players. The present work was aimed to compare the anthropometric and physical characteristics of elite 1 Cameroonian soccer players according to the ranking of their team.

Methodology: Ninety one soccer players of three elite teams, including 30 from the top of the ranking [Coton Sport of Garoua (T1)], 30 from the middle of the ranking [APEJES of Mfou (T2)], and 31 from the bottom of the ranking [Aigle Royal of Menoua (T3)] of the Cameroon football championship, agreed to participate in the study. Anthropometric [height, sitting height, weights, cormic index (CI), and body mass index (BMI)] and physical [short-distance sprinting times, flexibilities, lower limb strengths, maximum aerobic speed (AMS), maximum oxygen consumption (VO2max)] parameters were determined.

Results: T3 had significant high CI than T2 and T1 players. No difference was found in BMI between the three teams. Performances in sprint, vertical jump and the predicted VO2max were significantly higher in T1 compared to T2 and T3 ($p<0.05$). T3 were more flexible compared to T2 and T1 players ($p<0.05$).

Conclusion: The top ranking team of elite 1 football championship 2017-2018 season (CS) had older, bigger, heavier, faster, enduring and more powerful players than those of the middle (T3) and the bottom ranking team. Therefore, these parameters may partially justify the differences in the ranking teams in elite football championship.

Key words: Football players, ranking teams, Anthropometric and physical parameters

KAGOU DEMANOU Maiva

The perception of customer´s about local financial institution automated teller machine

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This study analyse customer's perception on the use of Automated Teller Machine (ATM) of local financial institutional in Yaoundé. A sample of (65) ATM users of institution were handed surveys on various aspects related to customer experience with ATM machines. Data analysed using SPSS (statistical package for social sciences) revealed that most users were satisfied with the service. Using chi square test, the data revealed that there was not gender biased with respect to satisfaction on the use of ATM machines. This study thus shed light on the awareness of the ATM services to nature evident results in customer's satisfaction in society and as a view point for financial institution by showing how quality services offered by ATM service points are essential.

LEMOUOGUE Joséphine

Towards the host countries in Central Africa: the vulnerability of Central African refugees in Cameroon and Chad

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Refugees fleeing abuses in CAR live in various conditions of vulnerability in Cameroon and Chad. The purpose of this article is to help improve the resilience of asylum seekers in these host countries. Data on migration characteristics, associated vulnerabilities and resilience strategies were collected and nalysed qualitatively for this article. It shows that Cameroon and Chad, being very poor host countries, were unprepared for the reception and care of the waves of refugees. As a result, they face inadequate resources, equipment and basic services; which negatively impacts their living conditions. The intervention of NGOs, coupled with the role of the States and community action, are partial responses to the different types of engendered vulnerabilities.

Key words: Forced Migration, Refugee, Vulnerability, Resilience, Central Africa.

KENNETH Chi

Social network for anyone to come an express themselves at what the do best

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This project is about creating a social network platform called IRIS. Iris means rainbow in ancient Greek. Iris is a social network where users come to express themselves with what they do best such as dancing, singing, magic, modelling, freestyle etc. and upload videos of themselves doing these acts and increase their fanbase. In order to create this platform, a cross-platform framework solution was used in order to minimize the cost of maintaining multiple code bases for the platform. Iris will enable anyone of any age to come and show the world what he/she can do and make a living out of it with their growth in popularity.

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